The IRON AGE

May 5, 1960 A Chilton Publication The National Metalworking Weekly

Europe's Automakers Expand to Meet—

Booming Demand From World Auto Markets P. 33

Hot-Form Metals With Beryllium-Copper Dies — P. 71

Uranium Probes For Commercial Uses — P. 38

Digest of the Week — P. 2-3

Photo courtesy of Heintz Division—Kelsey Hayes Corporation

Aristoloy meets severe cold extruding requirements on track bushings for Caterpillar Tractor Company

On the backward extrusion of this track bushing a 3 x 5-inch hollow blank is extended to 8 inches in a single blow. For uninterrupted flow of production, chemical and physical uniformity of the material is essential.

On thousands of parts Aristoloy electric furnace steel has fulfilled the stern production requirements of cold extruding.

Controlled melting of selected scrap, careful rolling and precise heat treating and finishing, this is why Aristoloy is so ideally suited to high volume production where rejects caused by material faults and deficiencies can be so costly.

For complete information about Aristoloy leaded or standard carbon, alloy and stainless grades, call the Copperweld representative in your nearest large city . . . or write today for NEW PRODUCTS & FACILITIES CATALOG.

ARISTOLOY STEELS

COPPERWELD STEEL COMPANY

ARISTOLOY STEEL DIVISION • 4001 Mahoning Ave., Warren, Ohio • EXPORT: Copperweld Steel International Co., 225 Broadway, New York 7, N. Y.

KNOW YOUR ALLOY STEELS . . .

This is one of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

Normalizing Alloy Steels

There are several forms of heat-treatment commonly employed in the processing of alloy steels. Each in its own way modifies the mechanical properties and structures of steel, and each is chosen with a definite objective in mind. The five usual forms of treatment are normalizing, annealing, spheroidize-annealing, quenching and tempering, and stress-relieving.

In this particular discussion, let us consider briefly the purposes and effects of normalizing.

Normalizing is an operation in which the steel is heated to approximately 100 deg F above the upper transformation range, then cooled in still or agitated air. The basic purpose is to refine the prior structure produced by variations in finishing temperatures encountered in rolling or forging. The structure resulting from normalizing, being more uniform, will help create improved mechanical properties when the steel is subsequently reheated, liquid-quenched, and tempered.

There are times when large steel parts (heavy forgings, for example) cannot be liquid-quenched because of their size. In cases of this nature, the heat-treatment must consist of single or multiple normalizing followed by tempering.

High-temperature normalizing is sometimes used for grain-coarsening low-carbon alloy steels to promote machinability. (In high-temperature normalizing, steel is heated to more than 100 deg F above the upper transformation range.) At times it is possible to machine a steel in the air-cooled condition, the governing factor being the alloy content. However, the highly alloyed analyses may require annealing or tempering after normalizing, to decrease the hardness.

It is essential, when normalizing is employed, that free circulation of still or agitated air be provided. When air-cooling of individual bars or forgings is not practicable, the furnace charge should provide for some means of separation, such as racks or spacers.

If you would care to know more about normalizing, or any other phase of heat-treating, you are invited to consult with Bethlehem metallurgists. They are always glad to give you any help you need.

And remember that Bethlehem makes the full range of AISI standard alloy steels, as well as special-analysis steels and all carbon grades.

This series of alloy steel advertisements is now available as a compact booklet, "Quick Facts about Alloy Steels." If you would like a free copy, please address your request to Publications Department, Bethlehem Steel Company, Bethlehem, Pa.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

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BETHLEHEM STEEL

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The IRON AGE

May 5, 1960—Vol. 185, No. 18

Digest of the Week in

★Starred items are digested at right.

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News of the Industry

BETTER FORECASTS

Adjust Data—American Marketing Association group told by expert that their company data must be seasonally adjusted to be useful. P. 36

COMMERCIAL U-238?

Research Underway — Research shows that depleted uranium, a by-

product of fissionable U-235, can be cast, rolled, and extruded. Commercial markets could develop in a few years. P. 38

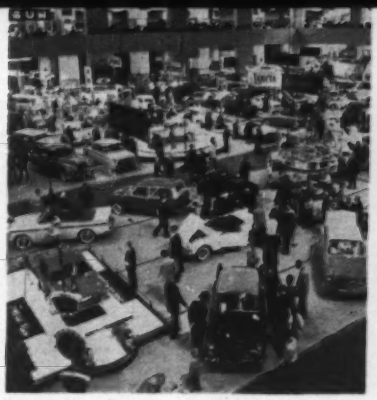
METAL POWDERS

Big Gains Ahead—If only a few of the new uses for metal powders reach their potential, the market will triple in the next few years. P. 39

PLASTICS RESEARCH

Industry-wide Institute? — Plans for industry-sponsored basic research institute are moving ahead. Its studies would aid plastics growth

Metalworking



Cover Feature

WORLD AUTOS—The lineup of cars at New York's Fourth Annual International Auto Show emphasizes the growing world demand for autos. This week's feature analyzes this trend and its effect. (Photo by Lew Merrim.) P. 33

and competition with metals industry. P. 40

STEEL EARNINGS

Profits Up, Outlook Down—A high rate of earnings in the first quarter is dimmed by the current market outlook. P. 41

Engineering-Production Developments

BERYLLIUM-COPPER DIES

For Hot Forming—In aircraft, forming of titanium calls for a die material that can withstand high-temperature effects. Recent research proves that a beryllium-copper alloy fills the bill on four main counts: It's non-galling, castable, weldable and not particularly expensive. P. 71

NICKEL-CHROMIUM ALLOY

Resists Furnace Gases—Materials exposed to heat-treat atmospheres must stave off corrosion, carburization and "green rot." A new nickel-chromium alloy has finally been released for general commercial use in all controlled-atmosphere furnaces operating right up to 2150°F. P. 74

PROGRAMMED MILLING

Fast and Accurate—Big strides are being made daily in numerically-controlled equipment. Take the case of 2200 templates from an aircraft company. Even though these templates varied in size and shape and covered more than 25,000 ft, the order was shipped within 90 days. P. 78

HIGH-SPEED PRESS

Break With Tradition—It's one thing to design a punch press to "break the speed barrier," but it's something else to develop a system to feed the parts at ultra-high speeds. P. 80

CLEAN AND DEGREASE

In Production Machining — Machine tool automation has outstripped cleaning machine technology, leaving a gap into which a new ultrasonic-processing unit fits nicely. The new setup now combines two steps into one operation. P. 84

Market and Price Trends

AUTOMOTIVE

Car Coolers Climb—Air Conditioners are becoming popular with more and more car buyers every year. This year should be no exception. But they aren't very popular with buyers of compact cars. P. 49

MACHINE TOOLS

Export Orders Are Up — The brightest light in the machine tool market is the recent rise in foreign orders. They account for 24 pct of the net new orders in the first quarter. P. 57

STEEL SUMMARY

Orders Lag—Some regional pick-ups in new orders brought a bit of optimism, but the overall rate of new business is disappointing. Automakers increased their orders for May and June, but not enough to keep the steel operating rate from continuing its decline. P. 121

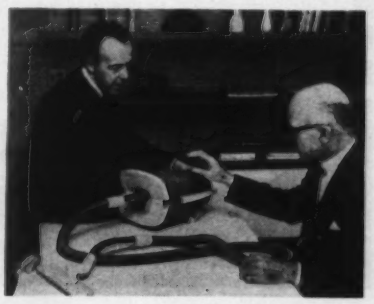
PURCHASING

About Gears—Gearmakers have had good sales during the past five months. And they expect sales to keep on the uptrend. Best sales come from heavy industrial and missile gears. P. 122

NEXT WEEK

PRODUCT DESIGN

Valuable Asset — This country needs products of improved design. Americans aren't buying foreign goods just because the price is cheap. Design also enters into the picture. Next week's issue will feature an article on the subject.



END RUST PROBLEMS FOR GOOD

USE STEELGARD

Reg. U.S. Pat. Off.

RUST PREVENTIVES

For Any Metal . . . For Any Length of Time For Any Application . . .

STEELGARD is a *whole family* of rust preventives built to protect your metals in almost any situation where corrosion may be encountered. Each STEELGARD is different because problems and plant requirements are different.

You may want:

- **protection for several hours or many years**
- **a dry, visible or invisible coating**
- **an oily but easily removable coating**
- **application to oily or wet surfaces**
- **protection for indoor or outdoor storage and shipping**

Whatever the situation, our technical men can recommend a STEELGARD that will protect your metal and your pocketbook, too.

STEELGARDS are used as received or diluted with water, mineral oil, or solvents for extra thrift. The water phase method protects while the metal is wet, drying or dry. It is water soluble only upon application and the dry coating prevents oxidation and rust.

This tremendously versatile family of rust preventives has racked up many remarkable problem-solving and money-saving case histories, as indicated to the right, and we would appreciate the opportunity to discuss your corrosion problems.

Write, wire or call and let us show you how STEELGARD can save you money over your present method and give you better rust protection.

SOME **STEELGARD** CASE HISTORIES

Light Gauge Stampings Protected, Painted Over Without Removal of STEELGARD

Parts were tested with other rustproofers, stored for days to weeks prior to painting. Only STEELGARD dried completely enough to allow painting without removal or affecting the paint.

Prevents White Rust on Galvanized Pipe

Galvanized pipe shipped to seaboard ports corroded fast. STEELGARD now keeps it bright and rust-free, leaves dry invisible film.

Metal Mold Protection

Steel or cast iron molds used in the glass, rubber or plastics industry were protected with oils and vaselines. Messy handling, dirt attraction and difficult degreasing were done away with by changing to STEELGARD which cost less and protected longer.

Rustproofing Hot Rolled Steel Nuts

Former oil caused skin rash and rust developed in a matter of days. Changed to STEELGARD, one or two minutes immersion. Entire shipment of nuts and bolts stays perfectly rust-free.

HARRY MILLER CORP. HAMICO 4th & BRISTOL STREETS PHILADELPHIA 40, PA.

Manufacturers of
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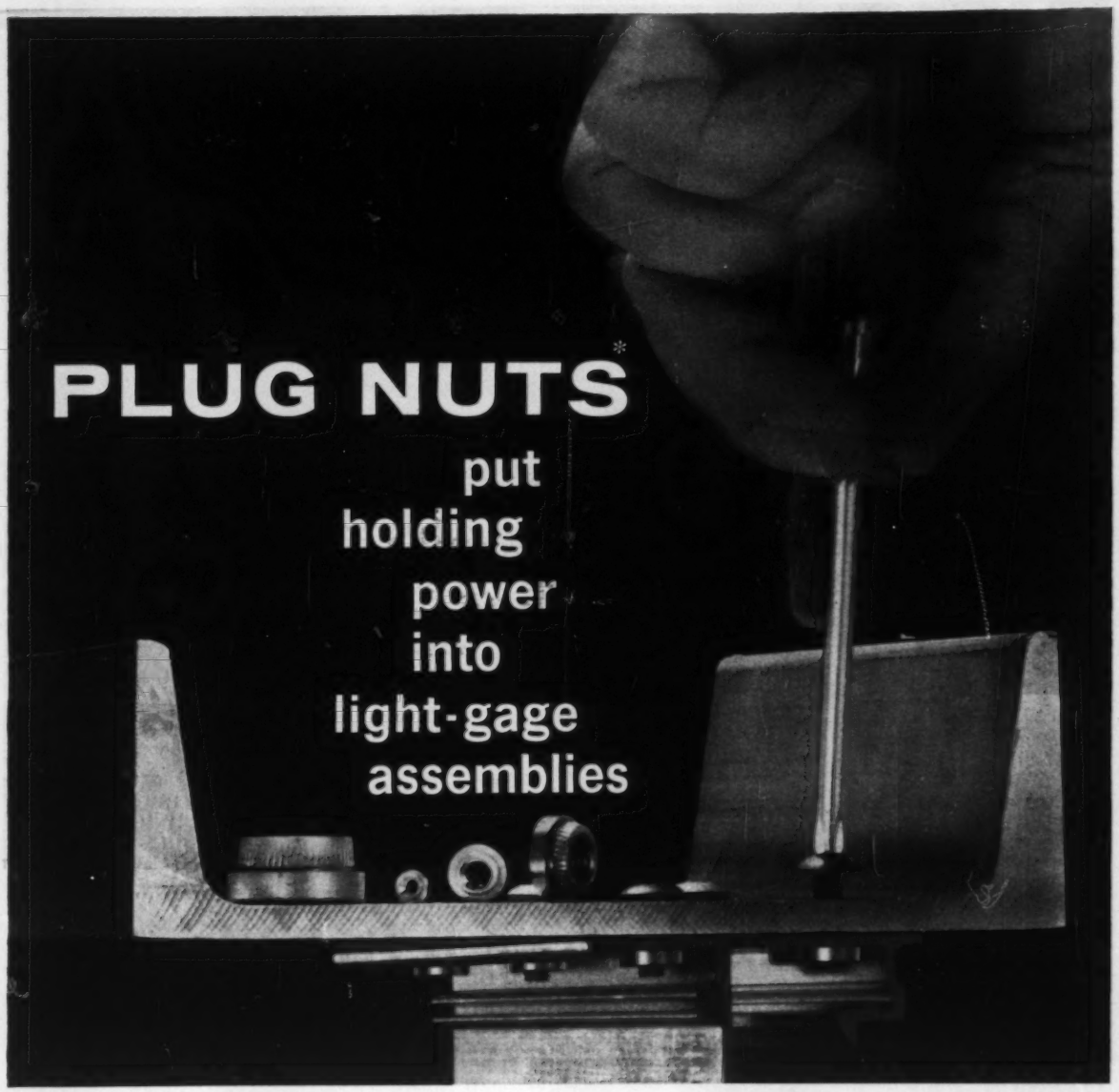
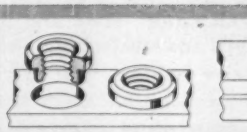


Think of Plug Nuts as "portable tapped holes". Consider using them when you're faced with problems such as thread stripping, hole enlargement, loss of bolt tension, blind fastening, tight clearance. Assembly bottlenecks? Plug Nuts can be installed *before* many forming and finishing operations.

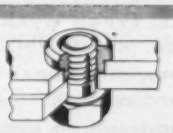
Current applications include instrument cabinets, cargo vans, metal window hardware, curtain walls. Give you any ideas?

Plug Nuts are made for use in any thickness of material down to .030" and in any tap size from #4 to ¾". You can have them in case hardened steel, brass, various grades of stainless and aluminum in a full range of finishes. Write us for samples and descriptive literature.

*Patented



Plug Nut is easily seated with hand punch or small press. Positive clinching occurs when displaced hole material flows into knurls and annular groove.

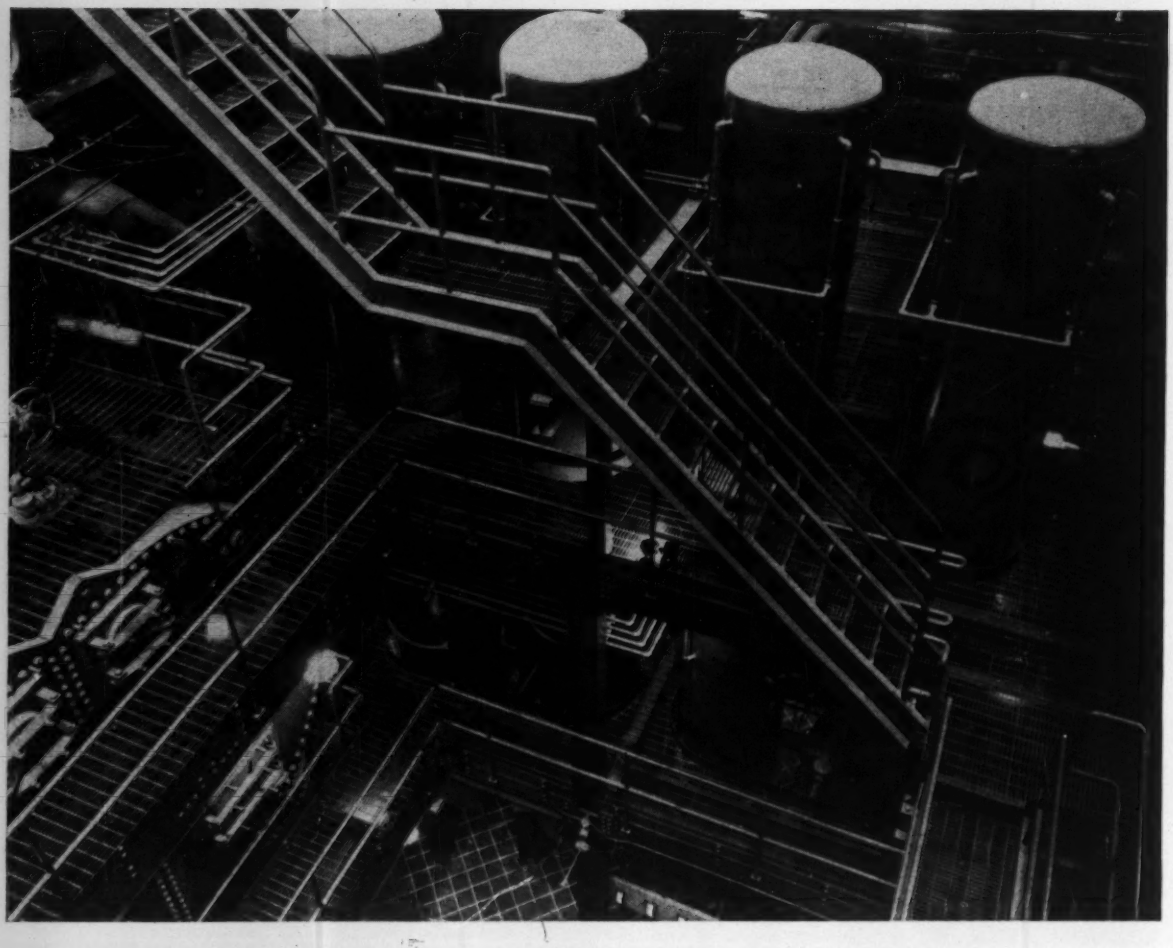


Plug Nut does not affect flatness of product material, nor does it project through. Low profile head is a real advantage where clearance is tight.

LAMSON & SESSIONS

5000 TIEDEMAN ROAD • CLEVELAND 9, OHIO

Plants in Cleveland and Kent, Ohio • Chicago and Birmingham



METAL FLOORING

Which of these 10 Ryerson types is best for you?

For complete and unbiased help on your metal flooring requirements you can count on Ryerson because:

ALL TYPES AVAILABLE—Steel and aluminum, open and solid, pressure-type and welded, etc.—any quantity.

FURNISHED READY TO USE—Cut to job requirements or in standard sizes.

ENGINEERING ASSISTANCE AVAILABLE—Help in matching types and materials to service needs, layout and fabrication assistance, etc. is yours for the asking.

FAST SERVICE—Standard types in stock for immediate delivery, other types quickly available.

FLOORING AND STAIRWAY PRODUCTS IN STOCK

RY-WEDG OPEN FLOORING (carbon steel, stainless steel* or aluminum*)
RY-WELD® OPEN FLOORING (carbon or stainless* steel)
RYEX® EXPANDED METAL GRATING
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INLAND 4-WAY® SAFETY PLATE (carbon or stainless* steel)
REYNOLDS ALUMINUM DIAMOND TREAD PLATE
RELATED PRODUCTS: stringer channels, structural tubing, decorative panels of expanded metal, etc.
*Available on special order.

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The Parochial View: It Won't Work Anymore!

The average American business man is too busy to be an expert on foreign affairs. His assistants likewise are too busy carrying out his slew of orders, wishes and policies.

True, most business people scan foreign news —but their scanning often leaves a lot to be desired. Of course, the fellow whose income depends on how the foreign winds blow has to keep checking, reading, visiting and researching the probable effects of various changes abroad.

There are quite a few firms who have quietly sized up markets, new products, and techniques they discovered abroad. But these people who keep in close touch with what happens outside our borders are in the minority.

It can be argued that the businessman is so busy he has all he can do to stay above water. But that isn't an excuse for not knowing or not being familiar with major trends away from our shores. There are few significant changes in the world that will not eventually effect our man-on-Main-Street.

The days of parochial thinking—and acting—are over. Today, when the man in the small town is slated to leave for a month's trip abroad, things have changed. When he wears a shirt from India, carries a camera from Japan, has an international credit card, likes Italian suits, and will probably bring back glass and other works of art, the world has indeed changed. And we are talking about Joe Doakes, not Mr. Moneybags.

He will have to get used to some lurid changes in Africa. As those nations move snail-like towards democracy—their style—we are apt to see a temporary rise in autocrats and one party systems. In that movement—one step ahead, one back, two ahead, one back—we will be sorely tempted to wish for, try to establish, or argue that they ought to do it "our" way. They won't!

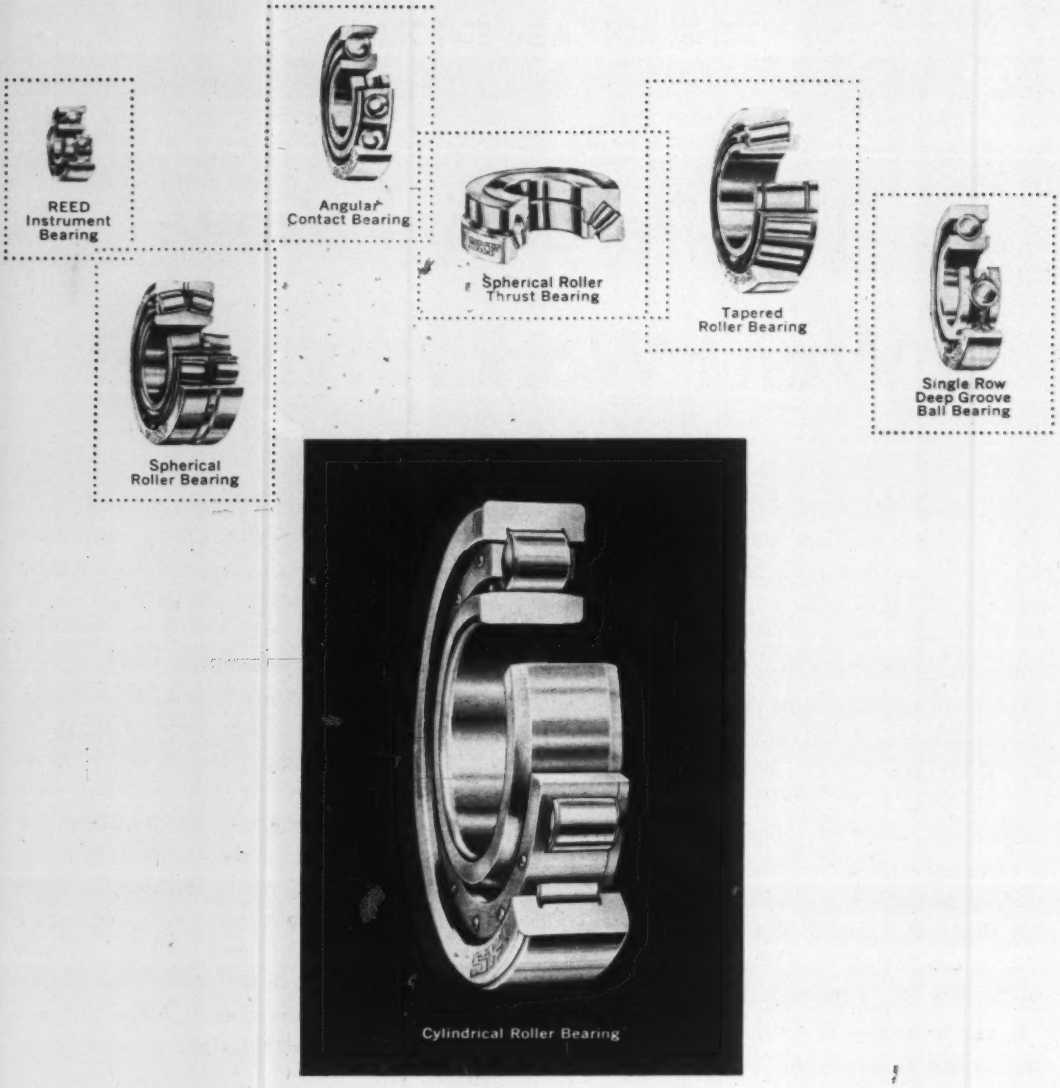
Or when we look to South America we make no mistake about it if we assume that feelings there are not far removed from Africa—when it comes to trying new things and catering to the masses.

If we are imaginative, we will wonder, too, what will happen in Japan. A nation about the size of Texas with close to 90 million people has to live. If it can't live and trade in harmony with us, it will go "elsewhere".

There isn't too much time left for all of us to drop our parochial attitudes and at least try to understand what is happening outside our borders.

Tom Campbell

Editor-in-Chief

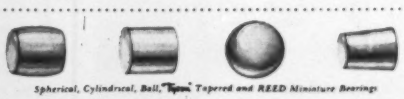


What's a "special size" in production bearings?

SKF makes so many standard sizes, there's practically no such thing as a "special size" of bearing. They range from tiny instrument bearings right up to four-row tapered roller bearings—and account for almost every possible bore size in-between.

Take SKF's standard cylindrical roller bearing, for example. It's promptly available in 154 sizes of single- and double-row types —for shaft diameters ranging from 1" to 9.5". Every size, in both types, offers high radial capacity in relation to its size and operates at highest speeds because of its very low friction.

So, before you specify a "special size" bearing, call the nearest SKF sales office first. The odds are better than 1,000 to 1 that there's already a standard SKF bearing of exactly the size you need. 6007



EVERY TYPE—EVERY USE
SKF
SKF INDUSTRIES INC., PHILADELPHIA 32, PA.

See them at the SKF Booth #1932 at the Design Engineering Show

Weld Without Deformation

Advances in diffusion welding make it possible to obtain good bonds at temperatures as low as 650°F. A new method, related to time-honored forge welding, involves the use of one or more intermediate metals to join base materials. In many cases the intermediate metals eliminate deformation during bonding. Joints produced have high strengths and withstand temperatures well above the bonding heat.

Alloy Resists Corrosion

Illium 98, a cast nickel-chrominum-copper-moly alloy, can be machined without difficulty. This new alloy was developed to withstand corrosives such as concentrated sulphuric acid at elevated temperatures. It contains about 55-pct nickel, 28-pct chromium, 8.5-pct molybdenum and 5.5-pct copper.

Produce Stiffer Sheets

Users of low-carbon, cold-rolled sheet and strip are giving a new look to hot-roller leveling. Stiffness can be improved 20 pct by working just below the low-brittle range without return of yield-point elongation. Aging increases the yield strength after working.

Process Speeds Extrusions

Ugine-Sejournet glass-lubrication techniques reduce costs and speed up the production of extruded shapes made from steel or stainless steel. This process is the basis of a new method that completely eliminates one of the most time-consuming steps in shape forming—the rolling process.

Tool Concepts To Change?

Spokesmen for a major machine-tool firm suggest radical changes in the look of tomorrow's tools. With greater use of computers in design, any manufacturing machine can be self-controlled, gaging operations to the shape of a desired part, rather than controlling the path of a cutting tool. These units would be controlled by a single operator at a pushbutton console—as in some advanced process industries.

Mill-Temperature System

A digital system, now under design, will operate from two output shafts of an analog computer. These shafts will represent temperature averages at two different locations in a steel coiling process. The system will record six digits of coil data, four digits of average finished temperature and four digits of coiling temperature.

Highly Stable Gage Blocks

In a long-range research program—aimed at an accuracy of one part in 10 million in gage block calibrations — the National Bureau of Standards has developed highly stable gage blocks. Three types of blocks show greater dimensional accuracy than AA grade commercial blocks. The extremely stable blocks meet precise space-age needs.

Broader Titanium Market?

A new, low-cost method produces titanium powdered-metal parts. Components made by this process exhibit corrosion resistance and strengths equal to wrought products. Sizes ranging from less than a few fractions of an inch to more than 35 sq in. in cross section are available in commercially pure titanium, as well as in titanium alloys. Shapes are limited only by die design.

Isotope Checks Coatings

Novel use of an isotope in liquid form to check the thickness of GMR-235, a high-temperature nickel-base alloy has been announced. Under test, Samarium-153, a low-energy radioisotope, dissolves in hydrochloric acid. The solution is used to measure tiny wall thickness variations in an experimental turboprop engine's vanes and blades. This gaging method suits other small, hollow extrusions or castings where normal gaging is impossible.

Pipe mills, too, need MODERNIZING

We are doing a lot of work these days on modernizing Continuous Butt Weld Pipe Mills and Seamless Tube Mills.

The continued and projected demand for pipe and tubes makes modernization of mills a must to maintain a competitive position in the business.

Individual items of the mills can be revamped. Existing mills can be rebuilt. Mills can be moved from one location to another.

As the "pipe mill people", we are constantly developing new ideas for new mills and existing mills. These ideas center on two main points: (1) to increase production and (2) to improve the quality of the pipe or tube.

We would like to talk to you about these new ideas and show you how your mills can be made more profitable. Write to Aetna-Standard Division, Blaw-Knox Company, Pittsburgh 30, Pennsylvania.

Aetna-Standard Division

BLAW-KNOX

LETTERS FROM READERS

Vote of Confidence

Sir—I have just finished reading your interesting editorial "Taxpayers' Rebellion: It Is Now in the Making!" in The IRON AGE issue of April 14.

I think if you will review the record of The Hon. H. R. Gross. House of Representatives, Third Iowa Congressional District, you will find he measures up to the standards set in your editorial. We in Congressman Gross' district are proud of the almost lone battle he has waged to do away with unnecessary and inefficient spending of our tax money.

Just recently Congressman Gross attempted to reduce the amount to be granted the diplomatic services for so-called entertainment expenses. I think it was more aptly named the "cocktail" allowance. The newspapers indicated the proposal made by Congressman Gross was shouted down by the House.

I believe if you would give recognition to his efforts it might prompt others to do likewise, because one congressman alone cannot win the battle of economy.—R. C. Wyth, Pres., Viking Pump Co., Cedar Falls, Iowa.

Numerical Controls

Sir—I highly recommend your article on "What Can Numerical Controls Do?" and would certainly appreciate receiving a reprint.—A. L. Hale, Property Mgr., Continental Aviation and Engineering Corp., Toledo, O.

Sir—Would you please send me six reprints of your article "What Can Numerical Controls Do?" as advertised in the April 14 issue.

I would like to be able to get the complete article consisting of all six sections. This series is exceptionally well written and should be in every engineer's library whether his job is concerned with tape or automatic controls or not. If everyone thinks and talks this same terminology the task confronting the manufacturers of automatic control equipment is made that much easier.

Keep up the excellent work with articles such as this.—P. E. Garlock, Asst. to Exec. Vice Pres., Leland - Gifford Co., Worcester, Mass.

Sir—Will you kindly send me six reprints of the article entitled "What Can Numerical Controls Do?" which was published on pages 149 to 164 of your April 14 issue. This article is very well written and illustrated and we plan to make use of it to acquaint our manufacturing personnel with the system.—C. J. Keim, Dir. Engineering Services, Oil Well Supply Div., U. S. Steel Corp., Dallas, Texas.

■ **Copies are in the mail.—Ed.**

South Africa

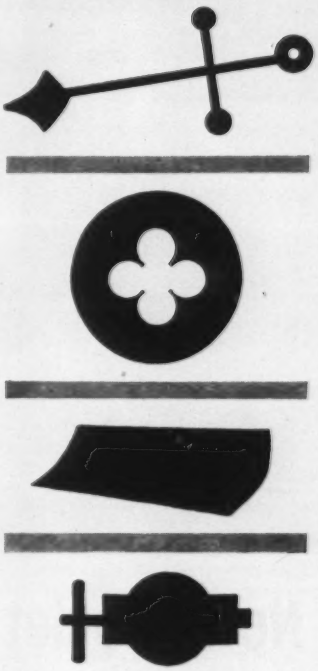
Sir—I can't resist complimenting you on the excellent editorial "South African Massacre: A Far Reaching, Stupid Act!" I think it is high time that political and economic leaders should think in terms of basic human dignity and morality, and your editorial does an excellent job in getting this point across.—J. H. Green, Mgr., Adv. & Merchandising, Island Creek Coal Sales Co., Huntington, W. Va.

"If you think merchandising is competitive, you should be in this department — six girls and one bachelor."

Maine Quiz #1

Can you identify these metal products produced in

MAINE?



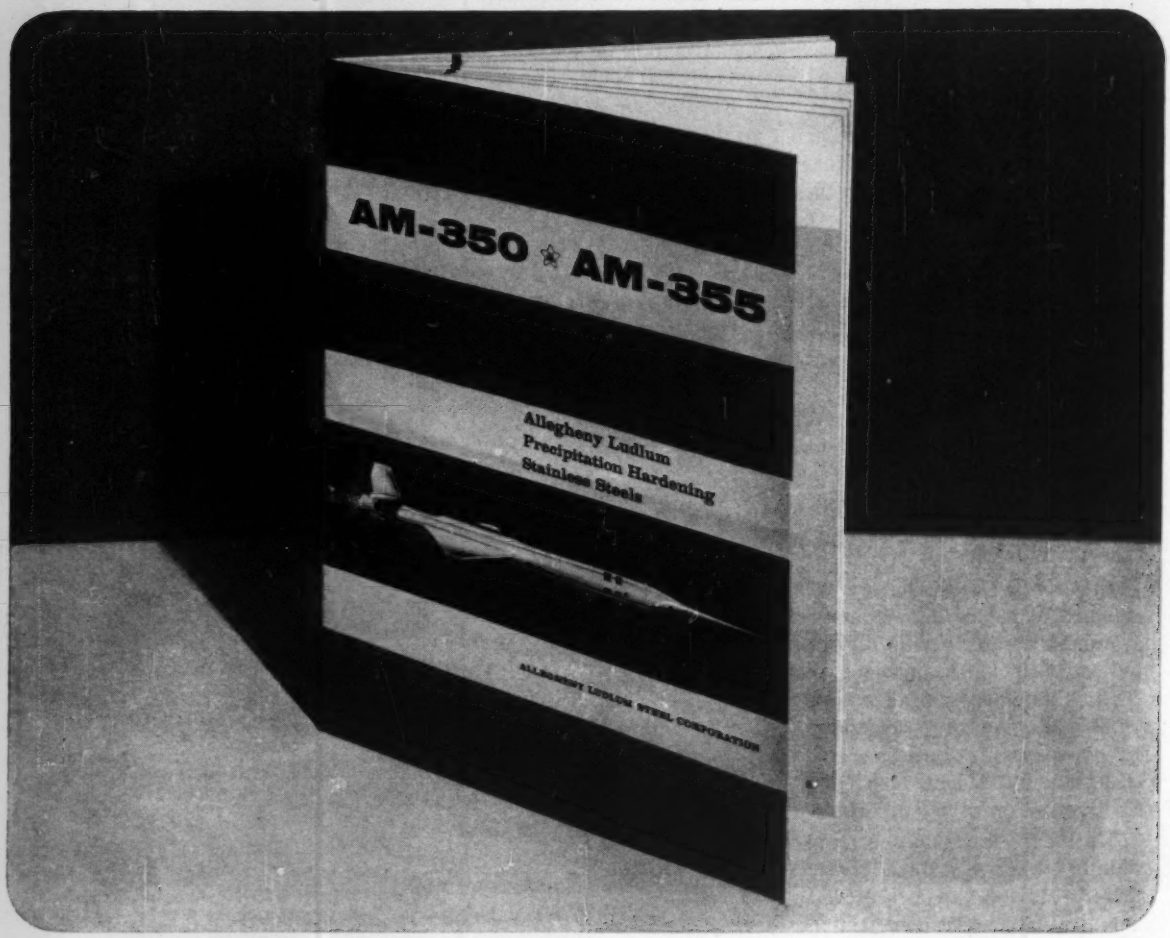
Answers — 1. Boat Anchor
2. Cutting Die, 3. Bulldozer Blade
4. Industrial Valve

Currently 150 metal working plants manufacturing machinery and ordnance parts, fabricated metal products, transportation equipment, and primary metal products are located in Maine. Over 5000 skilled workers produce thousands of machine tooled products daily.

Maine will produce the item of your choice. *Maine is the state for your new plant.* Write for our 56-page directory of the metal working industry in Maine and the *plan for 100% financing of new construction.*

Lloyd K. Allen, Commissioner
Maine Department
of Economic Development
State Capitol Augusta, Maine

Experience—*the added alloy in* **Allegheny Stainless**



New booklet on A-L's precipitation-hardening stainless steels, AM-350 and AM-355

A tool for anyone interested in high strength-to-weight metals

In this technical booklet, you get the facts on Allegheny Ludlum's precipitation hardening stainless steels, AM-350 and AM-355, metals developed for space age requirements.

AM-350 and AM-355 combine these unusual qualities. They are easy to fabricate. Have high strength-to-weight ratios at room and elevated temperatures combined with excellent resistance to corrosion.

The physical and mechanical properties of the two metals are described in 33 charts and tables. Included are heat-treatment and fabrication data, eight photomicrographs and a section on corrosion resistance with representative values in selected environments.

It's jam-packed with data. For your free copy, see your A-L representative or write *Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa. Address Dept. A-S-1.*

355

ALLEGHENY LUDLUM

EVERY FORM OF STAINLESS . . . EVERY HELP IN USING IT

Design Show Issue

Product design is an important factor in reaching marketing goals. Its influence is felt in sales, production, engineering and purchasing.

Decisions on styling, materials selection, and processing can make or break the profit potential of a product or line of products.

The IRON AGE's Design Show Feature is slanted to these important areas of product design. Among the articles you will find in next week's special Design Show issue will be:

1. **Industrial Design**—To what extent does product design influence marketing? Is packaging a factor? How far can you go with design changes? What are the limitations? An authority in the field answers these and many other questions in a three-page exclusive report.

2. **High - Temperature Plastics**—This fact-filled feature brings design engineers up-to-date on the properties and uses of plastics which withstand temperatures higher than those of most metals. An expert relates the many new developments in this fast-moving field.

3. **Value Engineering**—Why overdesign? This feature article gives the design engineer sound advice on how to cut down on frills, yet retain product quality and value. It gets into the heart of a major problem: How can you pare cost and stay ahead of competition?

4. **Low Temperatures** — Called cryogenics, this relatively new field of study of materials at temperatures near absolute zero holds the key to many developments. Spurred by the needs of rocket and missile programs, this area of research and development places vital information into the design engineer's hands.

5. **Composite Adhesives** — Production-wise, it makes good sense to assemble products by one method over another. But design-wise, it presents many knotty problems. This feature describes how the use of composite adhesives has overcome such bottlenecks.

6. **Glassed-Steel** — Glassed-steel has many merits as a corrosion-resistant, abrasion - resistant and heat-resistant material of construction. But it takes methods other than those of conventional materials to fabricate and assemble. As such, design is an important factor in making glassed-steel products more durable and useful.

Tower Talk

Keeping up with our editors isn't always an easy task. Recently, we sent assistant news editor Hilary Neal to New York to cover the International Automobile Show at the Coliseum.

When he came back, he said he had spent the afternoon at the Waldorf Towers.

Top Man—It turned out that he went there to interview Lord Rootes, chairman of the board of the Rootes Group of Automobiles. Lord Rootes is often referred to by other British automakers as the "Mr. Automobile" of their industry.

Lord Rootes is considered to be the spokesman for the British automobile industry. He knows it inside and out. Consequently, he was a valuable source of information for this week's cover story on the world market for automobiles. (See P. 33)

"Who hired that crackpot?"

"At TIMKEN Co., we use Koppers Impregnated Nozzles for cleaner shut-offs and improved steel"

says H. F. Walther
Superintendent, Melt Shop

The Timken Company's Steel & Tube Division prides itself on producing clean and uniform steel for its customers and for its own products in its Canton, Ohio, electric furnaces. That's why its teeming ladles are equipped with Koppers pressure-impregnated nozzles. Extensive tests by Timken Company proved that Koppers impregnated nozzles gave a smoother stream contour and better controlled rate of pour, resulting in less metal contamination due to bore erosion and nozzle failure.

"Koppers impregnated nozzles practically eliminated icicles, runners, leakers and drippers," says Tony Capuano, Pouring Pit Foreman, left.

"Our ingot quality is consistently higher now than ever before," says Ray Bloom, Metallurgist, right.

FOR THE HOW AND WHY OF KOPPERS PRESSURE-IMPREGNATION OF NOZZLES

Write for Report No. KN-100. It evaluates Koppers pressure-impregnation of nozzles for electric furnace and open hearth steel production.

Refractories Dept., 792 Koppers Bldg., Pittsburgh 19, Pa.

R-1

KOPPERS
PRESSURE-IMPREGNATED
REFRACTORIES

YOU'LL GET WATCH MAKER'S PRECISION WHEN YOUR "SPECS" READ HYATT

Holding roller diameter variation to 50 millionths of an inch is neither impossible nor impractical for Hyatt. With the help of automated precision equipment, we do it every day. For it takes precise and exacting care to build unsurpassed reliability into a Hyatt Hy-Roll bearing. Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.

Replacement bearings available through United Motors System and its authorized bearing distributors.

HYATT ***HY-ROLL BEARINGS***

IN ROLLER BEARINGS HYATT IS THE WORD FOR GM RELIABILITY

COMING EXHIBITS

1960 Castings Congress & Exposition—May 9-13, Convention Hall, Philadelphia. (American Foundrymen's Society, Golf & Wolf Rds., Des Plaines, Ill.)

Southwestern Metal Show — May 9-13, State Fair Park, Automobile Bldg., Dallas, Texas. (American Society for Metals, Metals Park, Novelty, O.)

Design Engineering Show — May 23-26, Coliseum, New York. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Production Engineering Show—Sept. 6-16, Navy Pier, Chicago. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Machine Tool Exposition—Sept. 6-16, International Amphitheatre, Chicago. (National Machine Tool Builders Assn., 2139 Wisconsin Ave., Washington 7, D. C.)

Iron & Steel Show — Sept. 27-30, Cleveland Public Auditorium, Cleveland, O. (Association of Iron & Steel Engineers, 1010 Empire Bldg., Pittsburgh 22.)

MEETINGS

MAY

National Fluid Power Assn.—Spring Meeting, May 8-12, Grand Hotel, Point Clear, Ala. Association headquarters, 5595 N. Hollywood Ave., Milwaukee.

International Acetylene Assn.—Annual convention, May 9-10, St. Francis Hotel, San Francisco. Association headquarters, 30 E. 42nd St., New York.

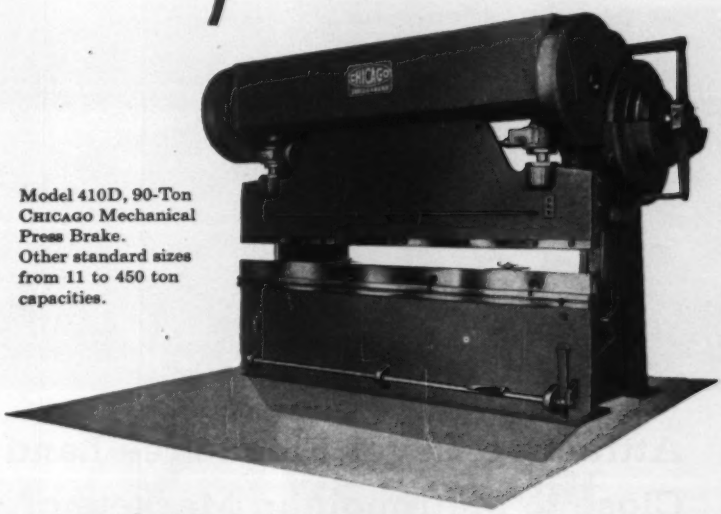
Society for Non-Destructive Testing—2nd Southwest regional convention, May 9-11. The Baker Hotel, Dallas, Texas. Society headquarters, 1109 Hinman St., Evanston, Ill.

American Mining Congress—Coal convention, May 9-11, Pittsburgh. Headquarters, 1200 18th St., N. W., Washington, D. C.

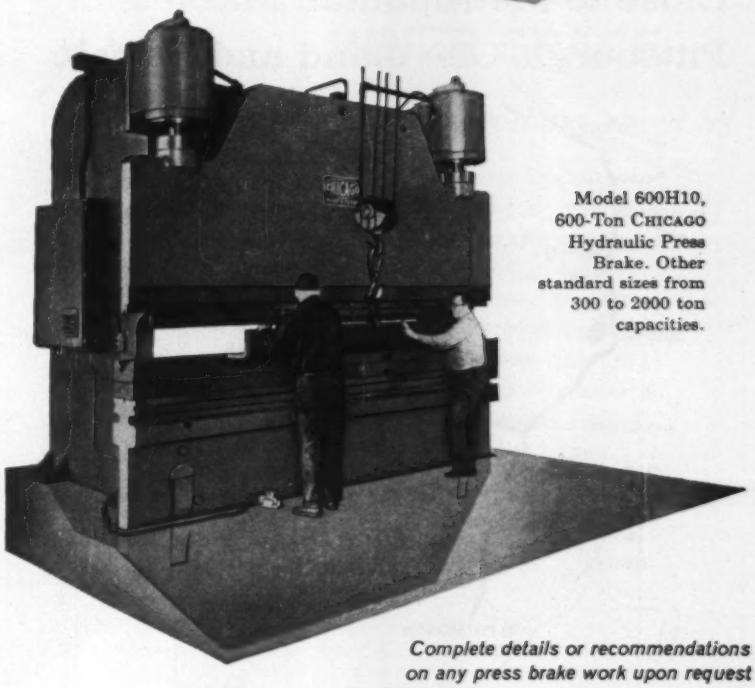
(Continued on P. 16)

CHICAGO® PRESS BRAKES

unexcelled accuracy / ***for sheet metal and plate work***



Model 410D, 90-Ton CHICAGO Mechanical Press Brake. Other standard sizes from 11 to 450 ton capacities.



Model 600H10, 600-Ton CHICAGO Hydraulic Press Brake. Other standard sizes from 300 to 2000 ton capacities.

Complete details or recommendations on any press brake work upon request

8439

Press Brakes
Press Brake Dies
Straight-Side-Type Presses
Hand and Power Bending Brakes
Special Forming Machines

CHICAGO DREIS & KRUMP

DREIS & KRUMP MANUFACTURING CO.
7430 S. Loomis Blvd., Chicago 36, Illinois

HERE'S YOUR IDEAL PLANT SITE!

GREENVILLE, PA.

Attractive, Level, Flood-Free Land Close to Metropolitan Markets of Pittsburgh, Cleveland and Buffalo

This adaptable 750 acre plant site is ideally located adjacent to Greenville, Pa., and is only 80 miles from Pittsburgh and Cleveland; only 150 miles from Buffalo. Next day rail delivery to these points.

Extensive deposits of coal, limestone, clay and aggregates nearby. Steel and other basic materials available with 24-hour delivery service.

Investigate today! Write or phone for *location factors* of this site.

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INDUSTRIAL DEVELOPMENT DEPARTMENT

1830 FRICK BUILDING • PITTSBURGH 30, PA. • ATLANTIC 1-4780

The Bessemer Man is at your "Site Service"

MEETINGS

(Continued from P. 15)

Machinery Dealers National Assn.—Annual convention, May 11-14, Edgewater Beach Hotel, Chicago. Association headquarters, 1346 Connecticut Ave., N. W., Washington 6, D. C.

The Anti-Friction Bearing Mfrs. Assn., Inc.—Annual meeting, May 11-13, Westchester Country Club, Rye, N. Y. Association headquarters, 60 E. 42nd St., New York.

Steel Service Center Institute—Annual meeting, May 15-18, The Fontainebleau Hotel, Miami Beach, Fla. Institute headquarters, 540 Terminal Tower, Cleveland.

Copper & Brass Research Assn.—Annual meeting, May 15-18, The Homestead, Hot Springs, Va. Association headquarters, 420 Lexington Ave., New York.

Electronic Industries Assn. — Annual convention, May 18-20, The Pick-Congress, Chicago. Association headquarters, 1721 DeSales St., N. W., Washington, D. C.

National Assn. of Purchasing Agents—Annual international convention and Inform-A-Show, May 22-25, The Biltmore Hotel, Los Angeles. Association headquarters, 11 Park Place, New York.

Industrial Heating Equipment Assn., Inc.—Annual spring meeting, May 22-25, The Homestead, Hot Springs, Va. Association headquarters, 1145 19th St., N. W., Washington, D. C.

Aluminum Wares Assn. — Annual meeting, May 23-24, Greenbrier, White Sulphur Springs, W. Va. Association headquarters, First National Bank Bldg., Pittsburgh, 22, Pa.

American Supply & Machinery Mfrs. Assn., Inc.—Triple industrial supply convention, May 23-25, Chicago. Association headquarters, 2130 Keith Bldg., Cleveland.

outer space is NOT our specialty

This power operated Monorail crane with electric hoist provides for simplified storing and immediate accessibility of every coil.

WE EXPLORE INNER SPACE

–and we do something about it!

American Monorail Engineers can show you how you can convert lost ceiling space into efficient avenues of overhead handling. With a Monorail system your floor space is safer, less cluttered and you gain additional work area. Monorail systems also make it possible to process work in motion, reduce idle time and worker fatigue.

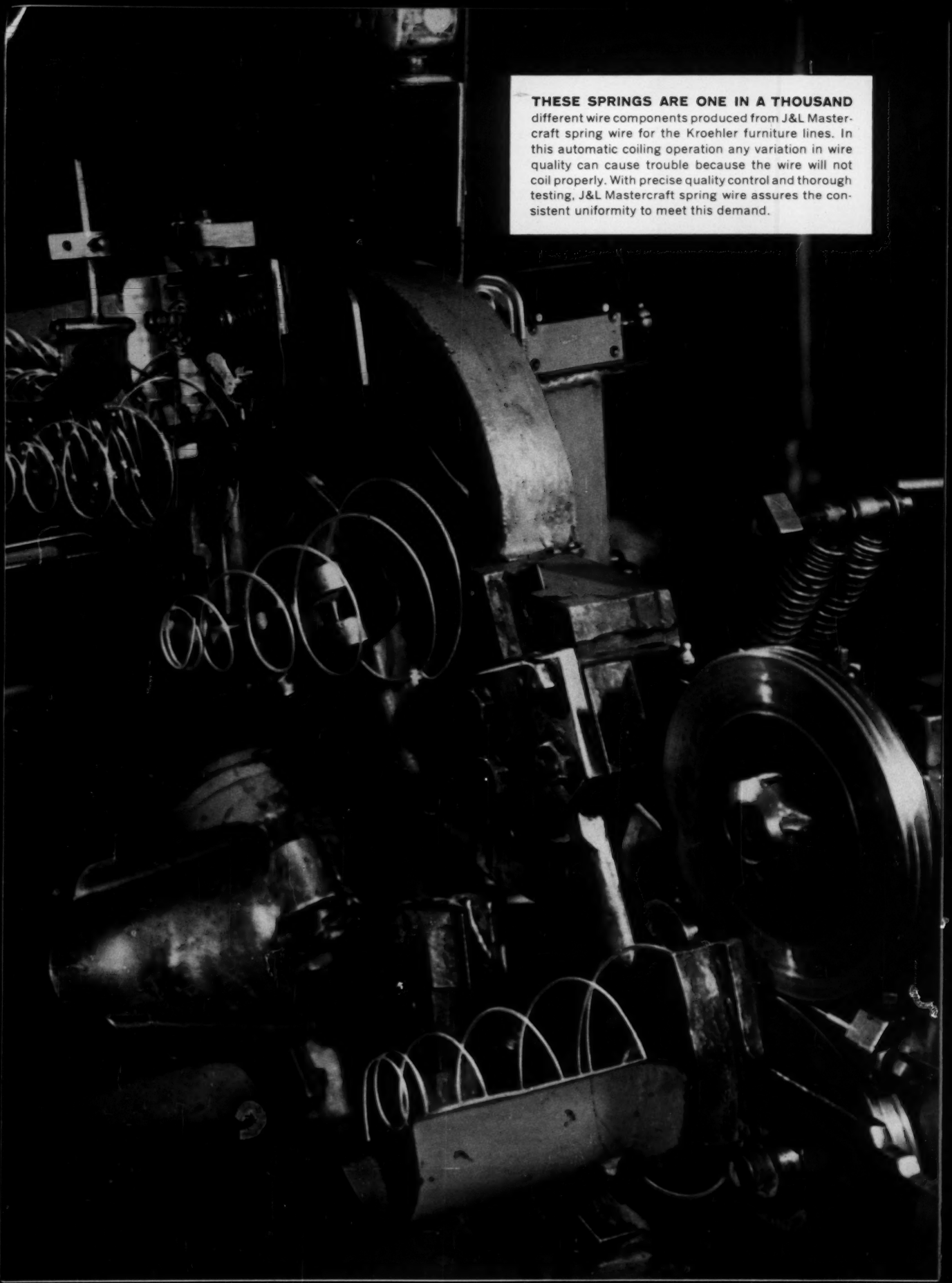
Write for Free Booklet with 56 pages, 99 photos.

ENGINEERED MATERIALS HANDLING

1103 EAST 200th STREET CLEVELAND 17, OHIO

AMERICAN MONORAIL © A.M.Co. 1960

DIVISIONS: Conveyor Division, Tipp City, Ohio – Canadian Monorail Co., Ltd., Galt, Ont.



THESE SPRINGS ARE ONE IN A THOUSAND different wire components produced from J&L Mastercraft spring wire for the Kroehler furniture lines. In this automatic coiling operation any variation in wire quality can cause trouble because the wire will not coil properly. With precise quality control and thorough testing, J&L Mastercraft spring wire assures the consistent uniformity to meet this demand.

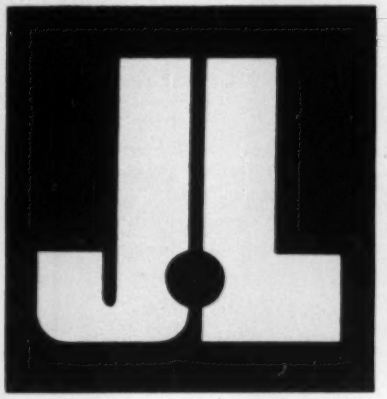
Bottom cross crimps for Kroehler davenports require a spring wire that will withstand severe punishment in crimping. At this Naperville plant, capacity is over 100 units of furniture an hour.

Custom-made Kroehler cushions require many components made from J&L wire.

Spring wire cones, crimps, links and side wires are assembled on carefully fitted sofa frames.

Layers of rubberized sisal, burlap, cotton and top fabric are applied to seat frame assembly.

A skilled operator applies finishing touches to this Kroehler chair.



Over 400 separate items of furniture are produced for the Kroehler and Valentine Seaver lines by 17 plants in the U.S. and Canada. Helping to uphold the Kroehler reputation for fine furniture are the many spring wire components produced from J&L Mastercraft wire.

Report from the world's largest furniture maker...

"We reduce rejects, machine downtime and waste with J&L Mastercraft spring wire"

. . . Kroehler Manufacturing Company

"We've never had to remove a J&L Mastercraft coil from a machine . . . never had to call in J&L to solve a wire deficiency problem.

"Our machine operators are sold on J&L wire. The uniform physical properties of Mastercraft spring wire result in more uniform production runs, with fewer machine adjustments. Also, J&L's special spring wire finish does not foul our machines. That means fewer shutdowns for equipment cleanup."

Similar facts are reported by many other automatic spring-making operators. Reduced rejects, increased production are achieved because every coil of Mastercraft, hard-drawn MB or Electromatic oil-tempered MB spring wire is quality controlled, completely tested.

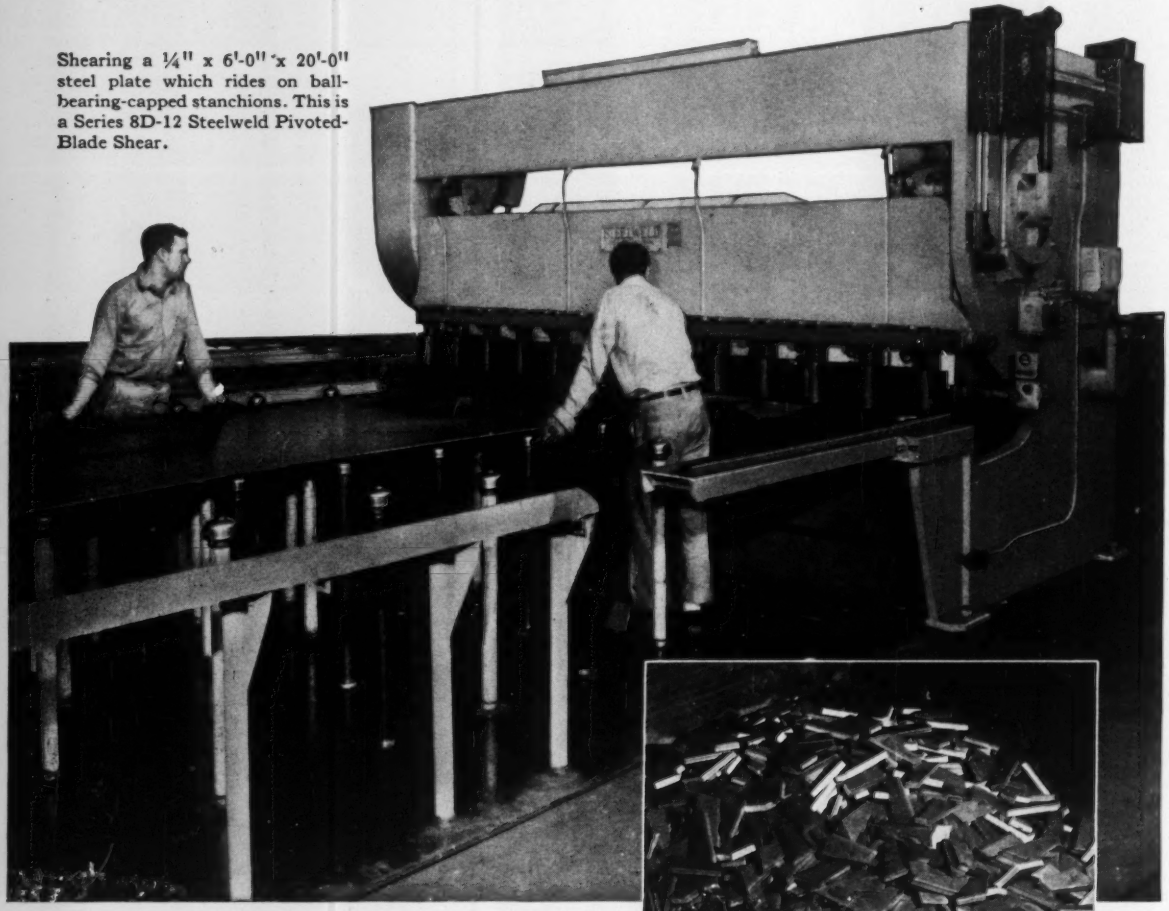
Try this superior J&L product. It's tops in quality, competitive in price. Contact your nearest J&L district office, or write to Jones & Laughlin Steel Corporation, 3 Gateway Center, Pittsburgh 30, Pennsylvania.

Jones & Laughlin Steel Corporation

PITTSBURGH, PENNSYLVANIA

STEELWELD SHEAR
Serves TOUGH JOBS Well

Shearing a ¼" x 6'-0" x 20'-0" steel plate which rides on ball-bearing-capped stanchions. This is a Series 8D-12 Steelweld Pivoted-Blade Shear.



A part of an order of 120,000 gussets cut on the shear.

FOR several years a Steelweld Shear has been in operation at the Drake Steel Supply Co., Los Angeles, California. Most of the time it has been worked on a 16-hour-a-day schedule. It is used for a wide variety of shearing, mostly on 3/16-inch and ½-inch steel plate.

The machine has proven itself on all sorts of shearing jobs. A particularly tough one was the cutting of 120,000 small odd-shaped gusset plates. These were of three sizes and cut three to six at a time of ½-inch steel. The work jarred the shear terrifically, but because of its heavy construction, did not affect it in any way.

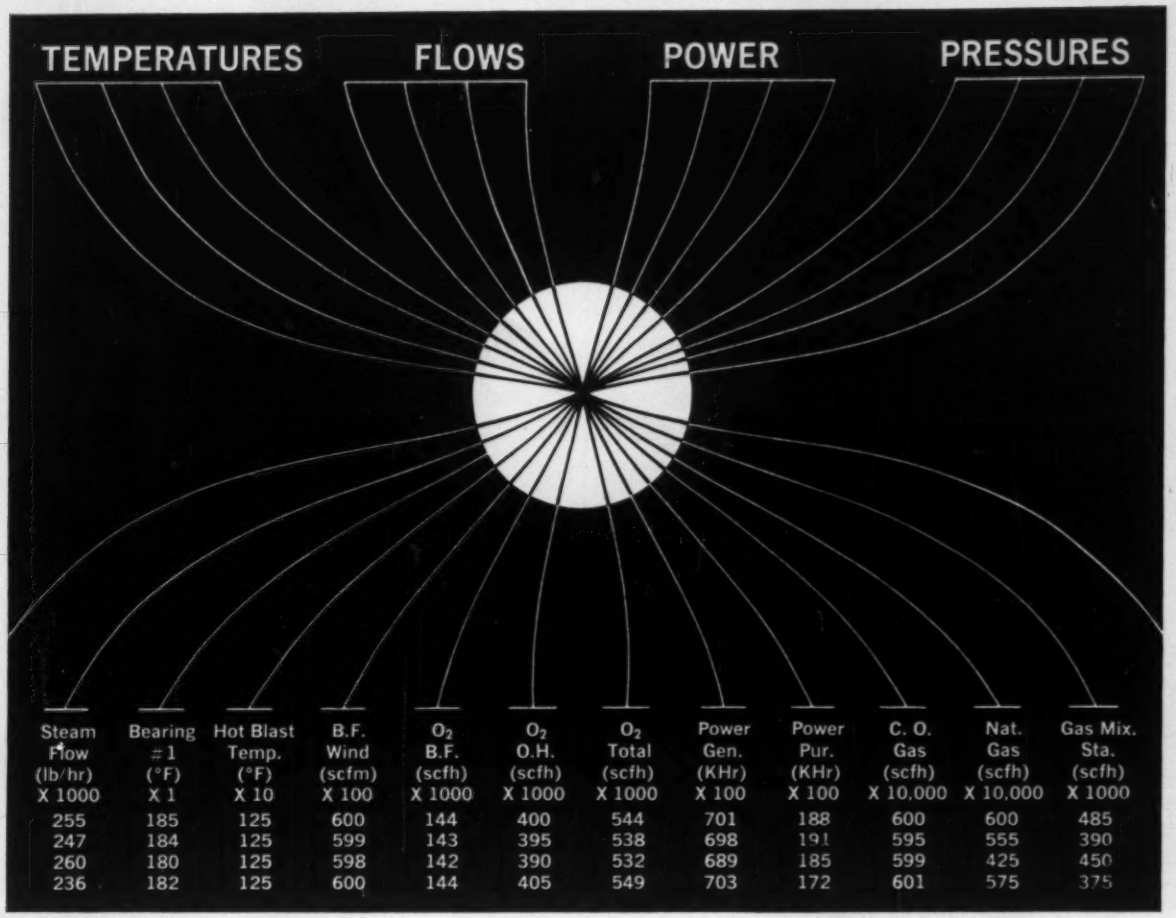
Considering the volume of work and hard service, the knives hold up very well. They need be turned only about once every six months.

Write for free copy of catalog No. 2011

STEELWELD
Mechanical and Hydraulic
SHEARS PIVOTED BLADE

Steelweld Machinery includes: Mechanical & Hydraulic Shears and Press Brakes, One-, Two- and Four-Point Straight-Side Presses, Speed-Draw Presses.

THE CLEVELAND CRANE & ENGINEERING COMPANY • 4858 EAST 282nd STREET • WICKLIFFE, OHIO



Steam Flow (lb/hr) X 1000	Bearing ±1 (°F) X 1	Hot Blast Temp. (°F) X 10	B.F. Wind (scfm) X 100	O_2 B.F. (scfh) X 1000	O_2 O.H. (scfh) X 1000	O_2 Total (scfh) X 1000	Power Gen. (KHr) X 100	Power Pur. (KHr) X 100	C. O. Gas (scfh) X 10,000	Nat. Gas (scfh) X 10,000	Gas Mix. Sta. (scfh) X 1000
255	185	125	600	144	400	544	701	188	600	600	485
247	184	125	599	143	395	538	698	191	595	555	390
260	180	125	598	142	390	532	689	185	599	425	450
236	182	125	600	144	405	549	703	172	601	575	375

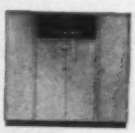
centralized recording

with KYBERNETES Series 2000 —most flexible, all electronic data processing system

Centralized control of most steel mill processes is now available. The next step is to centralize the recording of those process variables that are important, from either an accounting standpoint, or as vital information in the control of the process. The Hagan Kybernetes series 2000 Data Processing system provides unmatched flexibility and the reliability required by industrial operations. Here are some of the reasons why Kybernetes can add to the efficiency of your operation:

- May be used for research (for example—the compiling of information on blast furnace operation) as well as for intermediate operational records.
- All variables are recorded on one or more typewritten sheets with up to 90 columns per sheet. This makes computation simple—speeds compiling of fuel reports.
- Data may be simultaneously recorded on magnetic tape or punched tape for use in computers.
- Kybernetes is the only data processing equipment on the market that provides uninterrupted alarm scanning. That is, no matter what other functions the machine is performing, scanning for off-normal conditions continues, and alarms are set off if any variable exceeds the pre-set limits.
- High accuracy with easy re-programming. Kybernetes systems provide easy change of any input, or its range. The system is so designed that spare parts stocking is minimum, and the system may be expanded to add additional inputs, or additional functions.

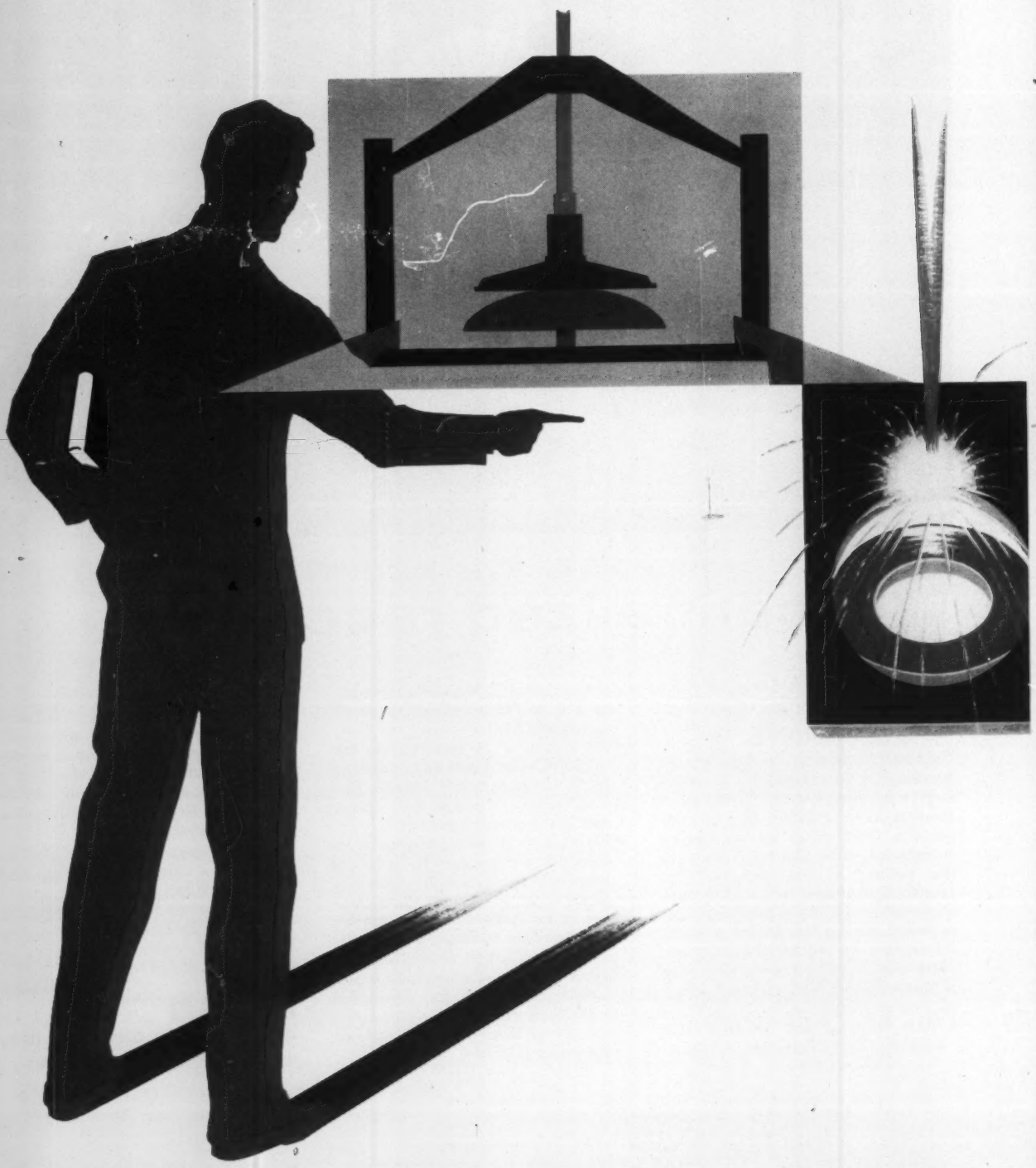
A Hagan engineer will be glad to explain the many labor-saving and unique advantages of the Kybernetes Series 2000 Data Processing System. Or write for Bulletin MSP 161.



HAGAN
CHEMICALS & CONTROLS, INC.
HAGAN CENTER, PITTSBURGH 30, PA.

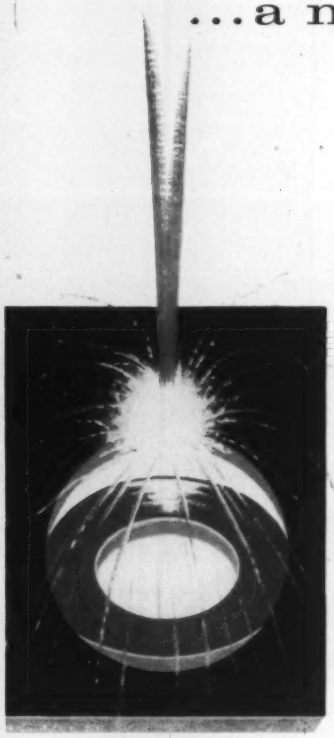
HAGAN DIVISIONS: CALGON COMPANY—HALL LABORATORIES—BRUNER CORP.

WHAT IS CF&I-



CLAYMONT?

CF&I-Claymont is a man with a textbook ...a man controlling a whirling head ...a man with fingers of flame



Claymont is an important part of a nationwide steel company — CF&I. Claymont is a mixture of materials, machinery and men. Of these, men are the most important.

Claymont is a metallurgist keeping abreast of technological development. It is also an experienced operating man whose discerning eyes enable him to control a spinning steel head so as to attain the proper shape and dimension. Claymont is another man with pride in his job — the flame cutter. His skill assures correct control of the complex operation of a 10-torch travagraph that cuts multiple patterns and irregular shapes in steel plates.

Schooling for Claymont engineers and technicians is not restricted to yesterday. These men are encouraged to continue their search for the new and improved, always looking to the future. As a result, CF&I-Claymont will continue to advance . . . and our customers are assured of the most up-to-date steel plate products available.

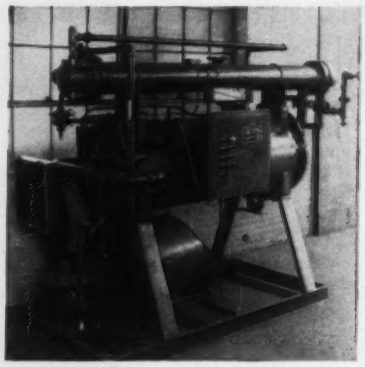
7684

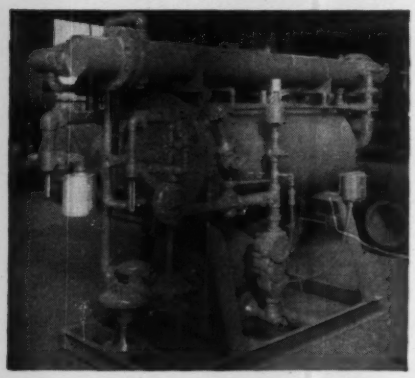
CLAYMONT STEEL PRODUCTS
THE COLORADO FUEL AND IRON CORPORATION
DENVER • OAKLAND • NEW YORK
sales offices in all key cities

CF&I STEEL

Which of these 3 KEMP GAS GENERATORS *can you use in your plant?*

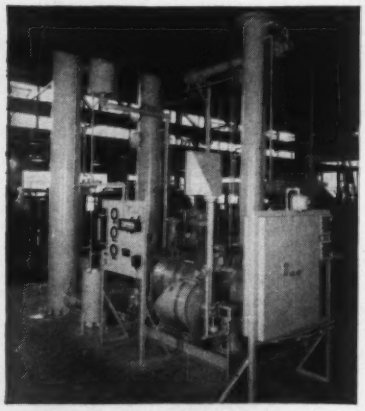
1 KEMP INERT GAS GENERATOR
—for working non-ferrous metals. Produces inert gases for use at low or high pressure, desiccated or unprocessed. Kemp gives you low-cost gas generation, completely automatic operation. Premixing in exclusive Kemp Carburetor and constant analysis assures highest thermal efficiency.





2 KEMP ATMOS GAS GENERATOR
—for working low-carbon steels. For gases low in carbon dioxide. As in all Kemp Gas Generators, test burner permits checking for proper combustion characteristics before igniting burners. Another safety feature: automatic fire-checks guard against flashback.

3 KEMP NITROGEN GENERATOR
—for working high-carbon steels. Completely eliminates CO_2 from gas, produces 99+% nitrogen. Features the easy start-up typical of all Kemp Generators. Vernier dial can be locked in position to maintain exact fuel-air ratio without further control manipulation.

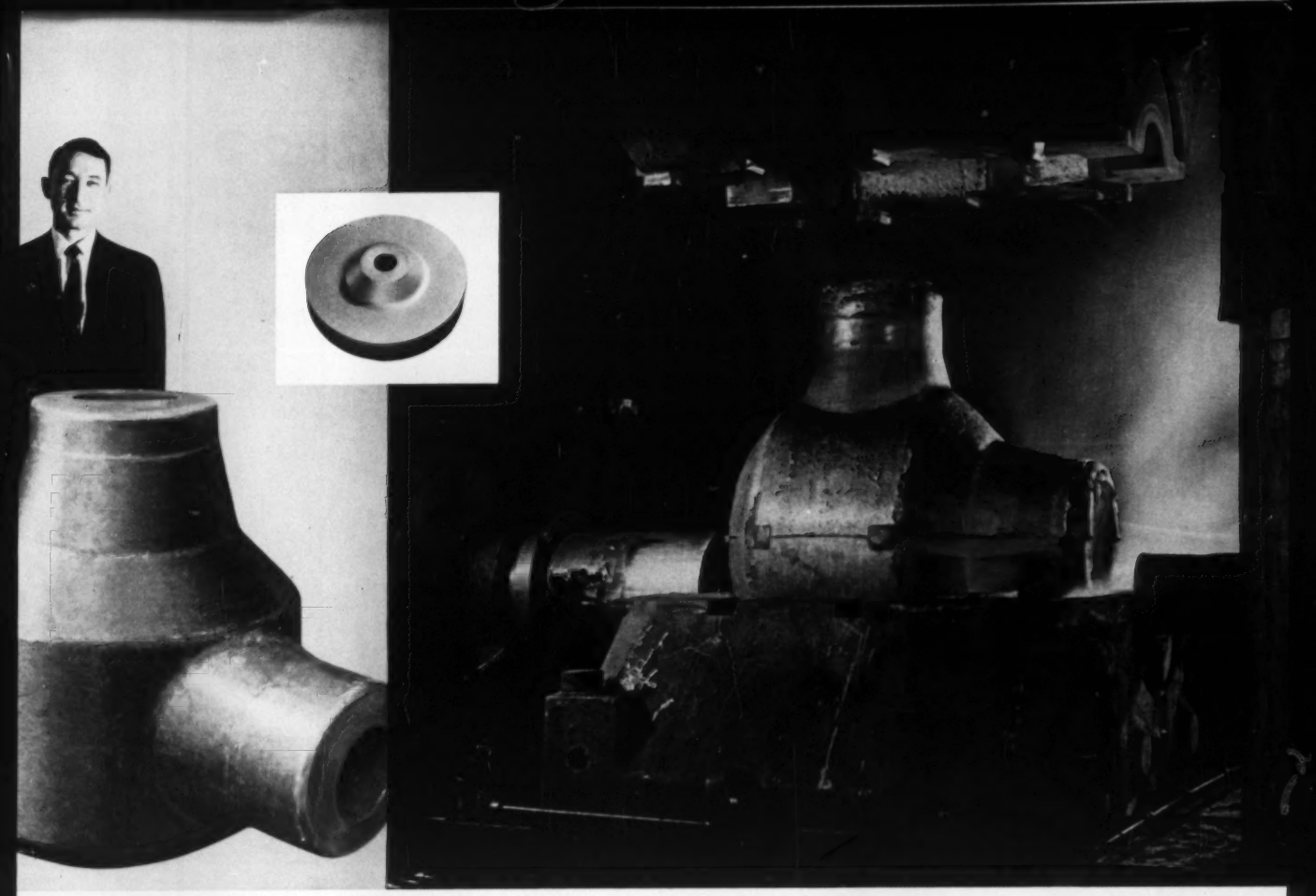


The Kemp representative in your area can advise you on the type and size of generator to best solve your problem. Talk to him or write: THE C. M. KEMP MANUFACTURING COMPANY, 405 E. Oliver St., Baltimore 2, Maryland.

It always pays to come to

KEMP OF BALTIMORE

THE C. M. KEMP MANUFACTURING COMPANY
405 E. Oliver St., Baltimore 2, Md.



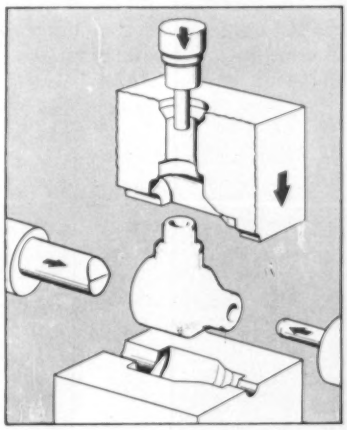
CAMERON FORGINGS

New properties — new quality for new design demands.

Cameron split die ferrous forgings have now been produced for more than a decade — a very short span in the ancient art of metal forming, but just in time to fulfill and stimulate new demands in an age which has made the greatest demands in the history of metallurgy. Our processes and forgings have no exact counterpart in previous forging practice. The 13,000 pound throttle valve body of chrome moly material, photographed above as it emerges from its split die in one of our side ram presses, is a typical Cameron solution to a recent problem, requiring large size, unusual shape and top quality.

The inset photograph gives an idea of our range in size and shape while producing the same superior properties. This jet engine turbine wheel, A-286 material, weighs about 13 pounds, but is one of today's most demanding applications for a precision member.

Large or small, our forgings possess unusual metallurgical properties because:



1. Cameron techniques allow intricate shapes to be forged in one heat, yielding uniformly high properties from center to surface and uniform fine grain size.

2. The movement of metal under high internal pressure increases the transverse ductility properties several times above normally expected values.

3. The internal working of the metal breaks up segregated material inherent in the center of steel and high density alloys and yields forgings that consistently meet high ultra-sonic standards.

4. The totally enclosed method of forging avoids flash line magnetic indications and the localizing effect of the flash grain on transverse, fatigue, and stress rupture properties.

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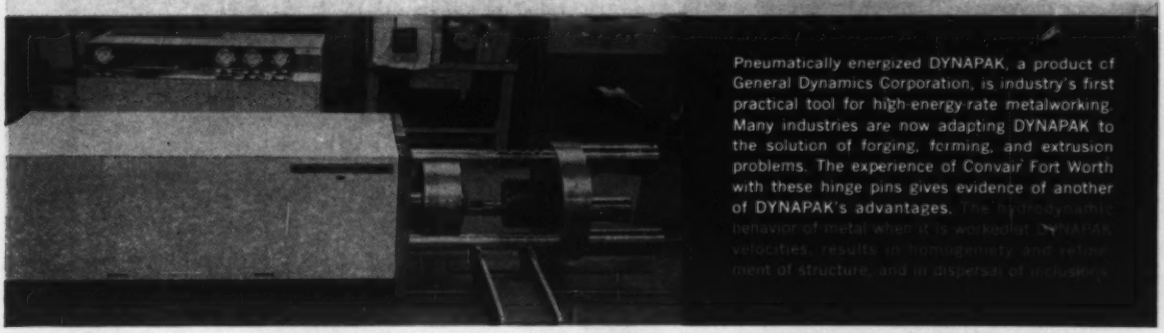
▶▶ *Here is clear evidence that high velocity extrusion of metal has dispersed stringy non-metallic inclusions. The part pictured is a hinge pin for* USAF's *B-58 Hustler. The pin on the left was machined from* AISI *4335 modified bar stock. The clearly visible inclusions made the part unfit for service. The pin at the right is made from the same material, but only after it had been extruded at very high velocities by a* DYNAPAK *machine. The inclusions have been eliminated. The part is completely satisfactory. There is no need to change to a more costly metal, or to resort to special mill heats.*



Pneumatically energized DYNAPAK, a product of General Dynamics Corporation, is industry's first practical tool for high-energy-rate metalworking. Many industries are now adapting DYNAPAK to the solution of forging, forming, and extrusion problems. The experience of Convair Fort Worth with these hinge pins gives evidence of another of DYNAPAK's advantages. The hydrodynamic behavior of metal when it is worked at DYNAPAK velocities results in homogeneity and refinement of structure, and in dispersal of inclusions.

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Norton Foundry News

NORTON

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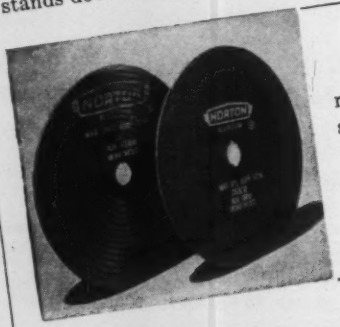
B11 resinoid bond gives wheels more uniform structure and better balance, assuring faster, cooler grinding, plus smoother operation. B11 wheels are available in sizes, types and half-grade increments of hardness for all jobs — on your swing frame grinders and floor stands down to the smallest portables.



BN and BNA straight wheels, reinforced with glass cloth, are strong and safe, excellent for cutting and notching gates and risers. Made in thinnesses down to 1/16″ and 3/32″.

BD and BDA wheels, raised hub type, glass-nylon reinforced, are ideal for a wide job range — smoothing casting surfaces, cleaning between teeth of large gear castings, many slotting and cutting operations.

Better Quality Control!

Now Better Than Ever

Newest modern plant — designed and equipped to improve the wheels foundries need most — now going strong!

Plant No. 8, the newest Norton building in Worcester, is a good deal more than another regular step in the steady expansion of Norton manufacturing space.

This ultra-modern, multi-million dollar plant was built specifically to improve the manufacture and performance of resinoid wheels — the wheels foundries need most and use most.

Working equipment is up-to-the-minute in every detail. In-line production, now in full swing runs as smoothly and accurately as clockwork. Quality control, always a key factor in Norton leadership, is now as thorough as latest processing development can make it. New Plant No. 8 and its new resinoid wheels are the latest proof of how Norton maintains "Touch of Gold" performance at highest efficiency.

The better the processing, the better the performance. That's why every Norton resinoid wheel removes more metal per dollar throughout longer service life.

Small Cup Wheels . . . Lots of Safety

Built-in reinforcement is available in Norton cup wheels of standard size 6/4 3/4 x 2". The new steel cup bushing, molded firmly into the wheel back, does not replace a wheelguard but does provide additional safety — another valuable feature of Norton portable wheels that do more work with less operator-fatigue.

On-the-job reports of how Norton resinoid wheels are paying off in ferrous and non-ferrous foundries are in the new report, Norton High Speed Resinoid Wheels for the Foundry, shown here. Your copy is available from your local Norton Representative . . . and is as near as your phone. Call for it today. NORTON COMPANY, General Offices, Worcester 6, Massachusetts. Plants and distributors around the world.

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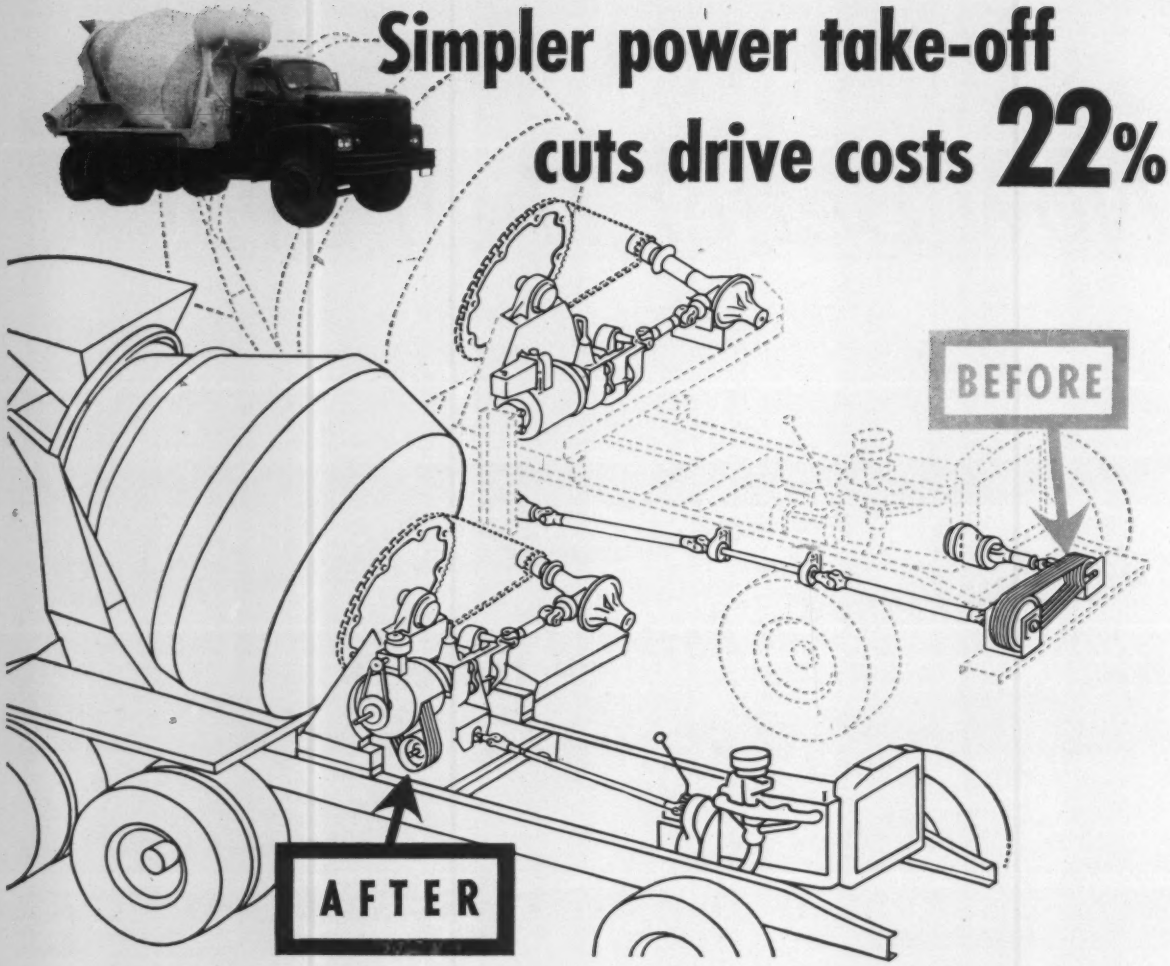
Simpler power take-off cuts drive costs 22%



Super HC V-Belts—packing higher hp capacity in smaller space than conventional V-belts—have eliminated need for front-end power take-off on concrete-mixer trucks made by Concrete Transport Mixer Company of St. Louis, Mo.

By letting take-off be shifted to rear, Super HC V-Belts cut drive costs alone by 22%, besides saving weight and cost of complex linkage and other components of the former front-end drive.

With Super HC, sheave diameters can be cut 30% to 50%, drive space up to 50%, and drive weight 20% and more. A product of Specialized Research in the world's largest V-belt laboratories, Super HC V-Belts are helping many manufacturers put more compact, lighter weight, lower cost drives on all types of machines.

Engineering Service Nation-Wide

What's *your* power transmission design problem? Your Gates Field Representative is ready to help you solve it—to cut space, weight, cost with Super HC V-Belt Drives. Ask him for your free copy of *"The Modern Way to Design Multiple V-Belt Drives"* or write The Gates Rubber Company Sales Division, Inc., Denver, Colorado.

TPA 485

The Gates Rubber Company, Denver, Colorado
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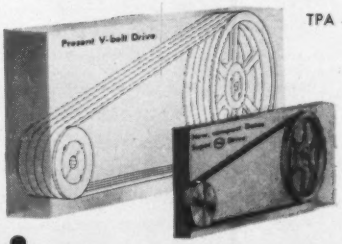


Gates Super HC V-Belt Drives

same hp capacity in smaller "package"

STEEL MILLS WILL CONTINUE CAPITAL SPENDING at a high rate according to indications from major mills. Pressure for cost reduction rules out any spending cutbacks. The industry, they say, has about 25 pct excess capacity but much is out-of-date.

INFLUX OF JAPANESE MARKETING MEN is starting, will grow in coming months. This is the time to check areas where you are competitive, plan to meet the toughest competition we've ever faced from Japan. And it won't be in pre-war type of cheap shoddy goods.

METAL CUTTING TYPE MACHINE TOOLS ARE UP slightly for the third straight month in 1960. The March figure was $49 million net new orders, rounding out the first quarter at slightly over $140 million--an annual rate of $560,600,000. This compares with $509 million for 1959. Export orders were 24 pct of total net new orders for the first quarter of 1960.

CHANGES ARE PROPOSED IN SMALL FIRMS AWARDS by government. The Small Business Administration plans to bar small firms from preferential treatment in government buying if the products for sale contain more than 50 pct foreign-made materials.

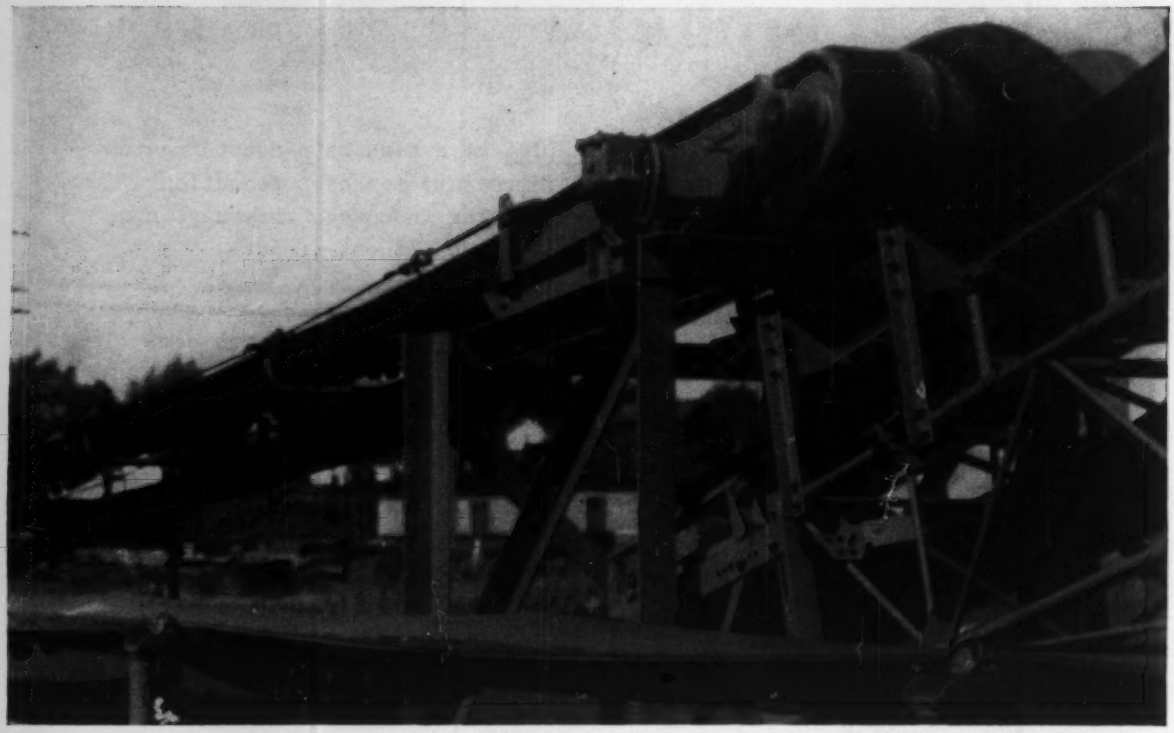
THE INDEX OF THE AMERICAN GEAR MANUFACTURERS ASSN. shows a 16.8 pct decrease in March from February. The March index was 231.8 (1947-49=100) for new bookings. This is below the 1959 average of 234.7. The index of shipments rose in March to 244.6, up from 230.2 in February.

OVERSEAS MARKET INFORMATION REQUESTS ARE UP 38 pct during the past year, says the Department of Commerce. One small manufacturer told the department that its foreign market aid had helped increase his overseas sales by 3½ times since 1955.

FABRICATED STRUCTURAL STEEL BOOKINGS in March amounted to 342,859 tons, the highest March total recorded since 1956. Total bookings for the first quarter of 1960 are up 9 pct over first quarter of last year.

PERSONAL INCOME AND EMPLOYMENT AT NEAR PEAK RATES, says the U. S. Department of Commerce. Personal income in the first quarter of 1960 was at a seasonally-adjusted annual rate of $393 billion, $21 billion above last winter's total.

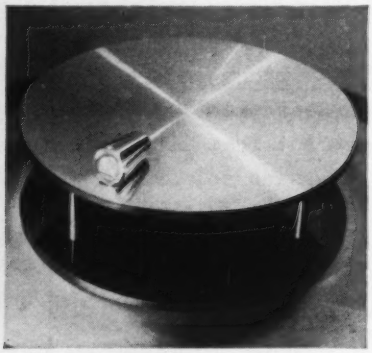
HOW JOY KEEPS IDLERS BUSY LONGER UNDER DIRT, DUST



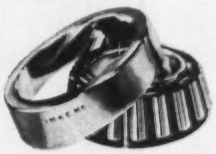
By switching to Timken® tapered roller bearings, Joy Manufacturing improved sealing for its Limberoller® two-bearing, single-unit Conveyor Idler . . . reduced bearing failures caused by dirt, dust, moisture. They also have continuous, smooth spillage-free and trouble-free operation. Timken bearings hold the idlers on center at all times, increase sealing efficiency, keep belt moving smoothly. And Joy engineers, by redesigning the unit, have cut bearing and housing assembly cost almost in half. Contributing to this saving are low-cost Timken "Green Light" bearings, which are produced in high volume.

On your own bearing applications, you'll find that Timken bearings assure minimum maintenance, long bearing life because: 1) They hold shafts concentric with housings, making closures more effective in keeping lubricant *in*, dirt *out*. 2) The tapered construction of Timken bearings lets them take radial and thrust loads in any combination.

ENGINEERING SERVICE FOR THE ASKING. Let our Timken bearing salesmen—graduate engineers—tackle your bearing problems, solve them in a hurry. Save *you* time and money.



ROLLS FOREVER IN PERFECT CIRCLE on oscillating table, proving the accuracy of its taper. Another demonstration of Timken bearings' precision manufacture that assures trouble-free performance.



Industry rolls on

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The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO." *Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits.* Canadian Division: Canadian Timken, St. Thomas, Ont.

Booming World Demand for Autos Spurs Expansion in Europe

Europe's automakers are spending hundreds of millions of dollars to boost production.

And they're spending much of it in the U. S. for high production and special machine tools. —By H. R. Neal.

▪ Some 86 automakers, most of them from foreign countries, recently showed their lines to nearly 300,000 visitors to New York's huge Coliseum. The occasion was the Fourth International Automobile Show.

While the visitors looked over the 311 models of automobiles, ranging in cost from $1000 to $27,000, The IRON AGE talked to executives representing many of the world's automakers. The conclusion:

Europe's automakers are preparing for a boom in the world market for automobiles. Since 1950, passenger car production in countries outside of the United States and Canada has climbed from 1.2 million units to 5.1 million units last year.

Spending Spree—Now, Europe's major automakers are in the midst of more major expansion programs. They're investing hundreds of millions of dollars to improve and expand facilities and to boost production. Much of this money is being spent in the U. S.

In the first three months of this year foreign orders for metal cutting type machine tools have totaled $33.9 million (see Machine Tools, P. 57). This is 24 pct of net new orders in the U. S. And over the past six months foreign orders represent 21 pct of the new business for machine tool producers.

Automation — There's strong evidence to suggest that most of the foreign orders are coming from Europe's automakers. And the evidence is equally strong that the buying isn't over.

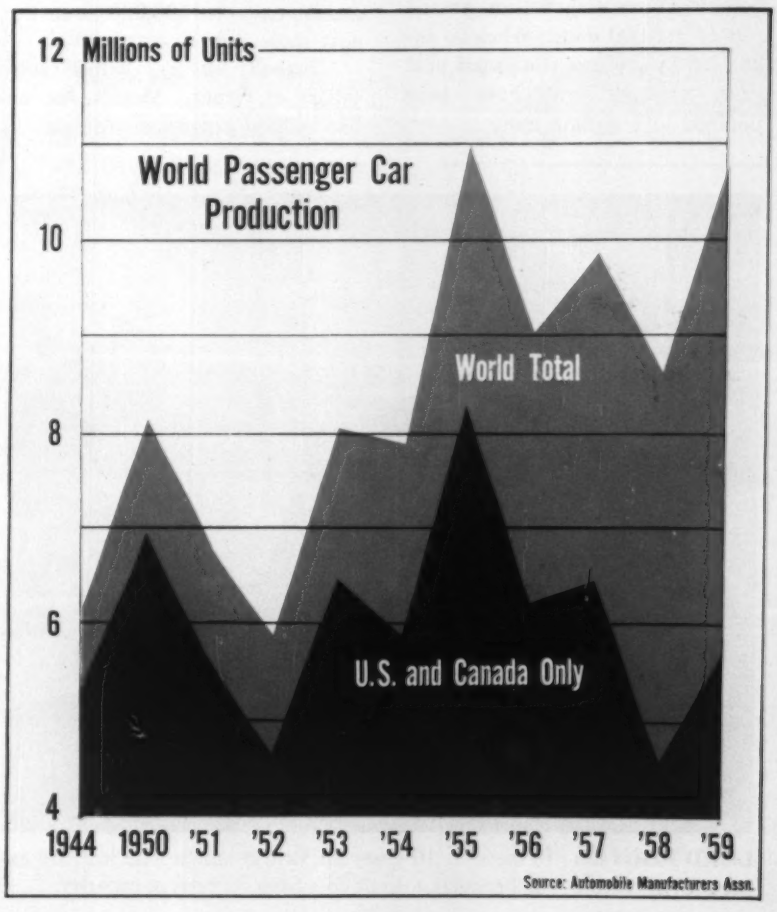
Most of the buying is for high production and special purpose machine tools—automation equipment.

It's safe to say that over the next few years, Europe's automakers will spend over $1 billion for plants and equipment.

Double Output — Lord Rootes, chairman of the board of Rootes Motors, is considered to be a spokesman for the British auto industry. And he's often referred to as the industry's "Mr. Automobile."

"Within the next two years," he

Auto Output Nears Record



told The IRON AGE, "the motor industry based in Britain will spend over $200 million for increased productive capacity."

A great deal more than that will be spent in the next decade, however, he points out. "In the next 10 years the British automobile industry expects United Kingdom automobile production to double from its present capacity of more than 1.5 million units annually," he says.

"All of our main manufacturers are in the process of expanding. We are naturally thinking in terms of more mechanization," he says. And mechanization means U. S.-built automation equipment.

Expansion Plans—J. W. Malone, deputy director of exports for the British Motor Corp., says BMC is spending about $137 million on expansion. As the largest automaker in Britain, it produced about 500,000 cars and trucks in 1959. It is currently operating at an annual rate of 750,000 units. When its expansion program is completed next year, capacity will have been doubled to 1 million units.

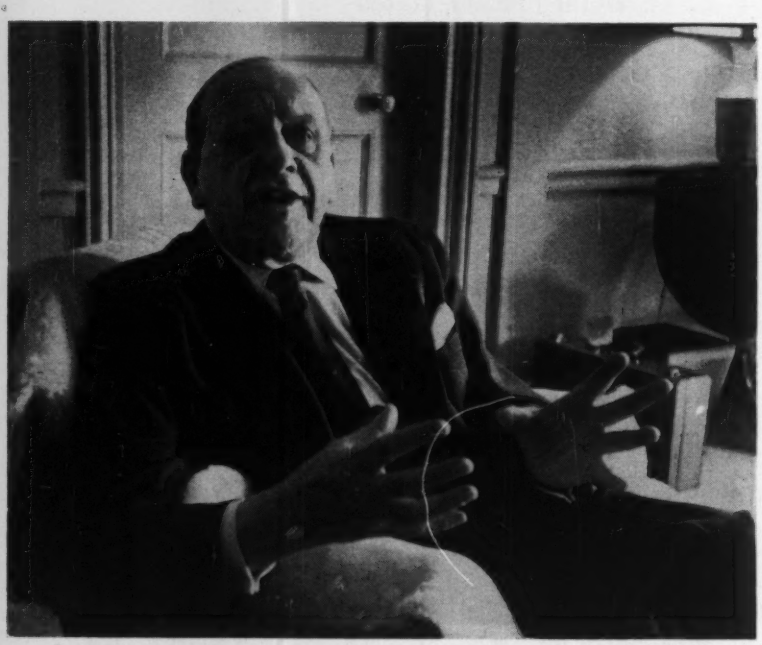
Ford of England, the country's second largest car builder, just completed a $200 million expansion program. Now, according to an executive, the company is spending another $160 million. The goal is to boost capacity from 400,000 to 500,000 units.

Emphasis is on boosting output of its small, volume car, the Anglia. The immediate program calls for increasing production from 750 per day to 1000. By the end of the year the company expects to produce 2000 per day.

Triple Capacity — Standard-Triumph Motor Co., another of Britain's larger automakers, says it is currently spending $15 million to boost output from 700 to 1000 units a day. This will be followed by another $50 million to raise output to the range of 1200 to 1300 units a day.

Standard-Triumph's program is aimed at tripling its production capacity from the present 200,000 annual units to 600,000 over the next three years.

Vauxhall Motors, British subsidiary of General Motors, has an $85 million expansion program.



LORD ROOTES: "In the next 10 years the British automobile industry expects U. K. automobile production to double from its present capacity. . . ."

More and More VW's—All of this would indicate that Lord Rootes' estimate of expenditures by British automakers over the next couple of years is very conservative. And expansion plans and programs aren't limited to Great Britain.

In Germany, Volkeswagenwerk GmbH, under the direction of Dr. Heinz Nordhoff, has increased production every year since 1947. That year the company built 8987 Volkswagens. Last year nearly 705,000 VW's were built.

The company spent $125 million to increase production in 1959. It will spend a similar amount this year to further increase production.

"Bankruptcy" for VW—Reflecting on past expansion problems, Dr. Nordhoff said: "I am . . . reminded of how a Secretary of State of one Bonn Ministry accused me of heading for bankruptcy because I had increased production from 130 to 180 units a day."

By the end of 1960, the company will be producing VW's at the rate of 4000 per day, or about 825,000 a year. And there is still a long waiting list for these cars in many countries.

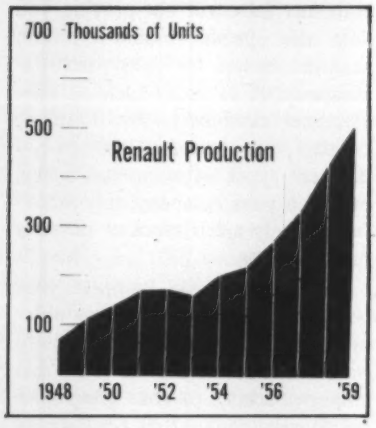
It is understood that General Motors' German subsidairy, Opel, has also placed tooling orders in the U. S. as part of an expansion program. The company only recently completed one such program.

France's Citroen—S. A. Andre Citroen, French automaker, turned out 287,000 Citroen cars last year, shipped 4000 to the U. S.—double the year before. In 1960, it expects to produce 317,000 units, sell 8000 in the U. S.

The company is building a new plant near Paris which, when completed in 1963, will increase production by 1000 units a day to 2600 cars. Its press works, covering 2.8 million sq ft, will be ready a year from now. A school is already underway to train press operators for the new plant.

At the same time, the company expects to produce some 2000 units of its small 2CV model in Argentina this year. In five years it plans an

Pierre Dreyfus
President, Renault of France



output of 30,000 units. Eventually, the company says, it may produce 80 pct of its 2CV's in Argentina.

Billions of Lire — Renault of France, that country's largest automaker, only recently completed a large expansion program under the direction of its president, Pierre Dreyfus. Much of the equipment for this program was purchased in the U. S., including a highly automatic press line. Two months ago, daily production was increased to 2650 units a day.

Last week at Turin, Italy, Fiat Motor Co. released information about its expansion plans. Dr. Vittorio Valletta, chairman of the board and managing director, said the company would spend 150 billion lire in the next two to three years. That's about $250 million.

For its money, Fiat expects to double production. Last year the company produced 430,000 vehicles, including 422,000 passenger cars. Just under 200,000 vehicles were exported. The company has already placed orders with U. S. machine tool firms, and more orders are expected.

Aimed at Home — Despite the lavish displays at the New York show and the importance of U. S. imports to Europe's automakers, the new expansion programs are not for the benefit of American buyers. They're aimed at buyers in Europe and the rest of the world.

Says BMC's Mr. Malone, an expert in world markets, "Our market studies show more and more families (in Europe) will own cars in a few years. And they aren't even thinking of it yet. The general standard of living is increasing all of the time." The economy of most countries is expanding, he notes.

A Ford of England executive says his company figures that it won't be many years before "free" Europe alone will offer a market for 6 million cars a year.

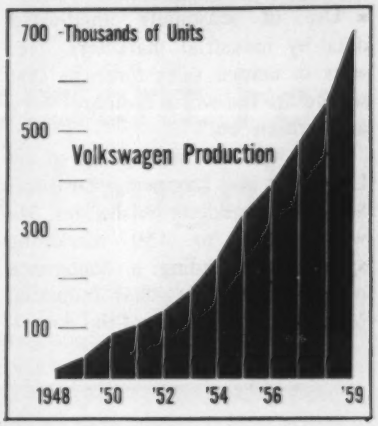
Bigger Than U. S.?—This agrees with a statement made in Paris last fall by Chrysler Corp.'s L. L. Colbert. Then he said the market for cars in Europe will exceed that of the U. S. "sometime between 1970 and 1975."

He noted a similarity between auto business conditions that existed in the U. S. in the 1920's and conditions that now prevail in Europe. "Even the ratio of cars to population is about the same. For example, . . . in France the ratio is about one to ten—almost exactly what it was in the U. S. in 1922."

Beyond Europe, he said, "are the rapidly growing economies of progressive countries in South American, Africa and the Australia area."

And Britain's Lord Rootes contends that eventually Communist bloc countries will have to be considered. "We have to think of what's to become of the Red sphere as a market because it accounts for the greatest population bloc — Russia and Red China. These are areas which have the fewest automobiles."

Dr. Heinz Nordhoff
President, Volkswagenwerk



Depend on U. S.—The British automobile executive concedes there is no easy road to trade with Communist bloc nations. It presents many great problems. But he feels that the question and its problems must be met.

Whether or not there is trade with these countries, it is apparent that the world market for automobiles is strong and growing stronger. The hundreds of millions of dollars being invested to expand production capacities attest to this. And Europe's automakers say they must depend on U. S. industry for much of their expansion equipment.

Reprints of this article are available as long as the supply lasts. Write Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

How Good Is Your Sales Data?

Marketers Told to Use Seasonally Adjusted Figures

American Marketing Association group hears expert say unadjusted company data is of no use in comparisons with national indicators.

Only adjusted figures discern true trends in your business. —By J. D. Baxter.

▪ Use of seasonally unadjusted data by industrial marketers, "results in annual sales forecasts that simply are not worth the paper they are written on."

This was the message given by Leonard H. Lempert, Director. Statistical Indicator Associates. He was talking to 150 marketing specialists attending a conference of the Eastern Regional Industrial Marketing Committee of the American Marketing Association last week.

Three Reasons — Mr. Lempert cited three strong reasons why use of seasonally adjusted data is important to marketing men:

It makes possible comparisons of company figures against industrial and national economic indicators, which are practically always seasonally adjusted.

Adjusted company data is the only way to tell whether your current trend is up or down. Often unadjusted data indicates a trend that is opposite to the actual trend.

Also, only through use of adjusted company data (sales, orders, etc.) can this data be translated into annual rates.

Comparisons—On using national indicators as a yardstick for company trends, Mr. Lempert said: "The only legitimate comparison possible is of your company data adjusted for their seasonals to national indicators adjusted for their seasonals; no other comparison makes the slightest bit of sense."

Even comparing with a broad industry category into which your company falls will not provide you with the specific month-to-month seasonal factors for your particular company. A category such as nonelectrical machinery, Mr. Lempert pointed out, includes perhaps 30 different types of such machinery, of which your company may manufacture only a few types or possibly just one type.

Morever, said Mr. Lempert, your company's seasonals probably differ at least slightly from other companies manufacturing the same machinery because of your geographical location, your major source of demand, your major sources of supply, and so on.

How It Works—What are seasonal adjustments? Explained Mr. Lempert: They are changes made in economic or business indicators —sales, orders, inventories, etc.—to eliminate seasonal influences so that underlying trend of the indicators may be discerned.

Seasonal factors include not only those influences directly attributable to the weather, but those that result from the different number of days in the 12 months of the year, from traditional industry selling seasons, from new model introductions, from inventory closedowns, and many other influences.

Seasonal adjustment involves the calculation of seasonal adjustment factors, and division of the original data (actual sales, etc.) by the factors, and multiplied by 100.

An Expert Tells Marketers . . .

"The Importance of Seasonal Adjustments is illustrated in a little realized fact concerning industrial activity during the 1959 steel strike.

"How many of you are aware that the nation's industrial activity actually increased from July through October 1959 in spite of the disruptive effects of the 4-month strike? It is a fact that the FRB's index of industrial production actually rose from 154 in July 1959 to 160 in October 1959.

"Why then the national emergency that resulted in an injunction sending the workers back to their jobs?

"Because from July through October, industrial activity based on normal seasonal influences alone should have increased from 154 in July to 168 in October. Thus, in spite of actually rising 6 points, the index was 5 pct below what it would have been if the normal 9 pct seasonal rise from July to October had occured.

"The real impact of the strike was shown clearly by the index only after adjustment for seasonal factors—the seasonally adjusted index decreased from 163 in July to 155 in October."—L. H. Lempert.

Ratios — Seasonal adjustment factors are simply series of ratios, one for each of the 12 calendar months of the year; the 12 factors totaling 1200. For a series with no seasonal influences, each of the 12 factors equals 100. For a series with differing seasonal influence in the various months, the factors range in both directions around 100. Some months are seasonally high, some seasonally low; the high months have factors above 100, the low months have factors below 100.

Example—Here is the example cited by Mr. Lempert to show how adjusted data points to a true trend:

Say, the factors for October, November and December sales of product X have been calculated to be 90, 100 and 110, respectively. Actual sales this October, November and December were $90,000, $100,000 and $110,000.

Dividing these sales by their respective seasonal factors and multiplying by 100, we obtain seasonally adjusted sales for October of $100,000, for November of $100,000, and for December of $100,000. That is, aside from seasonal influences, no real changes in sales occured in the three months. What looked like a rising trend was actually a leveling off after the expected seasonal influences were removed.

Charting—To compare a company series with outside indicators, and to determine annual rate of growth, Mr. Lempert urges use of logarithmic charts as, "The only really meaningful means."

Log charts eliminate arithmetic scale distortions that result from company and national indicators being in different units. Example: If a $10 billion increase in GNP takes up a half-inch on the chart, an equivalent (pct) increase in company orders would also take up a half-inch.

Also, long-term trend lines on logarithmic charts are true economic trends, for they indicate the "rate" at which the series is growing or declining.

CHAIN OF COMMAND: C. M. Beeghly (left) is J & L's new president. He succeeds Avery Adams (right) who remains chief executive officer.

New President For Jones & Laughlin

C. M. Beeghly becomes president of Jones & Laughlin. Avery Adams continues as chief executive officer.

New president came to J & L with acquisition of Cold Metal Products Co.

▪ Jones & Laughlin Steel Corp. last week named C. M. Beeghly as president. Mr. Beeghly succeeds Avery Adams in the post.

Mr. Adams had been serving as both chairman and president of J & L. He will continue as chairman and chief executive officer.

The move came as no surprise in steel circles. It was clear Mr. Beeghly was being groomed for the president's job when he was named executive vice president of J & L in April of 1958.

Former Post—Prior to that he was head of the company's Strip Steel Div. in Youngstown. He came to J & L in 1957 with the acquisition of Cold Metal Products Co. Mr. Beeghly had been vice president and general manager of Cold Metal Products.

In making the announcement, J & L points out that Mr. Beeghly's background ties in nicely with its product lineup. He has been associated with carbon, alloy and stainless strip products. Nearly half of J & L's finishing capacity is in flat-rolled steels, both carbon and alloy.

The recent trend in the company's product mix makes Mr. Beeghly's background particularly valuable. With acquisitions of Rotary Electric Steel Corp. and Cold Metal Products, J & L has moved strongly into the specialty field. Mr. Beeghly's experience has been largely with higher priced strip specialties.

Company Structure — The appointment also points up the emphasis on sales in the J & L management structure. Both Mr. Adams and Mr. Beeghly came up through sales functions. However, both have broad experience in management.

Summing up, a competent manager has moved to a top management post.

Are There Markets for U-238?

Research Shows Depleted Uranium Can Be Cast and Formed

Study is underway to find markets for depleted uranium, a byproduct of fissionable U-235.

Within the next few years it is expected to have many uses in the metalworking industry. —By F. J. Starin.

▪ If there is enough of anything available at the right price, someone is going to find a market for it.

This truism of American business is driving a "new" metal closer to the marketplace.

When atomic scientists extract fissionable U-235 from normal uranium they also wind up with about 140 times more non-fissionable U-238. This depleted uranium, slightly radioactive, is the by-product.

Huge Stockpiles—For almost 20 years the Atomic Energy Commission had been stockpiling this because few people knew what else to do with it. Now, stocks are getting so big that both the government and private industry are striving to find commercial uses.

Exactly how much depleted uranium is available is classified. But the Dept. of Interior says thousands of tons a year could be available.

Depleted uranium now costs about $4.60 a lb. But H. Hugh Willis, president of Nuclear Metals Inc., a private research and development organization which has done extensive work with normal and depleted uranium, points out that this is largely an arbitrary price. Starting costs are set by AEC. But since U-238 is only a by-product of $7000- to $10,000-per-lb U-235, its price could be reduced. "In fact," says Mr. Willis, "it is possible the government may reduce the price of depleted uranium starting material to move some of the huge stocks."

DENSE METAL: H. Hugh Willis, president, Nuclear Metals, Inc., shows that depleted uranium, U-238, has a density greater than those of beryllium, zirconium or thorium. This is one of the strong points of the metal that is expected to have wide industrial use within the next five years.

Experimental Shapes—NMI has probed the physical and mechanical properties of uranium. The company now makes some experimental depleted uranium mill shapes—mostly castings, sheet, and extrusions.

NMI, controlled by Textron, Inc., has been working closely with the Contract Machining Div. of MB Electronics, New Haven, Conn., a division of Textron Electronics Inc. MB is putting its extensive background in precision machining for the aircraft industry into work with uranium. One of the earliest successes of the combined efforts of the two companies is a high-uranium alloy rotor for a gyroscope.

Wide Uses—A report on "Non-nuclear Uses for Depleted Uranium" from Oak Ridge National Laboratory, run by Union Carbide Co. for AEC, notes that under certain conditions depleted uranium can be cast, extruded, cold-drawn, hot- and cold-rolled, forged and machined. The major problem right now, says the report, is that uranium is difficult to weld.

Mr. Willis says the 15 years' work his company has done indicates that special techniques rather than special equipment are the key to successfully working depleted uranium.

The Oak Ridge report also notes the ductility of depleted uranium is good, its thermal conductivity about the same as 400 series stainless steels, with electrical resistivity high for a metal. Its corrosion behavior is about the same as iron.

Big Advantage—One of its biggest assets is its density—about 70 pct more than lead. This has led to one immediate market.

NMI first became interested in depleted uranium when Technical Operations, Inc., Burlington, Mass., asked for a portable gamma ray shield. Lead, most commonly used, is too heavy. NMI's uranium shield weighs 60 pct less.

Search for Markets—Some other projects seeking new markets for depleted uranium:

At Rolla, Mo., a Dept. of Interior metallurgical research center is evaluating the possibility of alloying depleted uranium with lead, tin, and copper for bearings.

At Albany, Ore., another government lab is probing the contention of several metallurgists that uranium imparts exceptionally high tensile strengths to steel.

Military Uses — Many probers now believe that nuclear applications will take the biggest share of depleted uranium for the next few years. The main use: Gamma ray blankets or shields.

There has been some interest in military uses for depleted uranium, for items like armor plate and ammunition. Most efforts here are classified.

Steel Mill Interest—Reports from Canada, which probably has more uranium than the U. S. are that both industry and government are well aware of the problems and possibilities. Among others, Atlas Steel Co. is reported to be rolling uranium plate, and making rod stock in a rod mill devoted almost entirely to uranium. Some observers in the U. S. say steel companies will eventually get into uranium fabrication when tonnages get big enough.

New Markets Expected—How far is depleted uranium from commercial markets? A Battelle Institute report says "few new markets could logically be expected to develop within the next five years."

But Mr. Willis, head of NMI, says his company in cooperation with MB is now sending out numerous samples to companies for testing. "We are in the evaluation phase," he says. "By this time next year we'll know better where depleted uranium is going."

New Uses, Big Gains For Metal Powder

If only a few of the new uses for metal powders reach their potential, the market will mushroom.

Some of the new products and materials are analyzed at Chicago meeting.

■ "If just four of the list of new uses for metal powder would fulfill their apparent potential, we'd have to triple powder metal output over the next few years."

This was the comment of one metal powder producer in Chicago last week at the Metal Powder Industries Federation meeting. Others agreed, and the facts back them up.

Metal powder producers scored a 13,000 ton output gain in 1959 to a new record of 34,000 tons. They expect to go higher this year.

Biggest Market in Parts—Powdered metal fabricators are going after the stock parts market, boosted powder metal parts to 54 pct of total metal powder use in 1959. It's the first time parts fabricating has consumed that much powder in a year.

Powdered metal parts are pressed into a "green" form, which is sintered to give the part its final hardness and density. Parts formed of powder range from bearings and gears to television components. Automotive has been an important user of powdered metal parts.

And Still Growing—But the market is still growing. Welding rod coatings, powder for flame cutting, and electronic markets follow powdered metal parts, in that order. You can even eat it, and U. S. eaters are chewing up 65 tons of iron powder per year, in enriched foods.

To brighten the market picture, metal powder fabricators and producers are no longer bothered by foreign competition. U. S. imports of iron powder have declined steadily since 1956. Fabricators report foreign parts fabricators find the U. S. market too specialized to give them a foothold.

Looking Ahead—Metal powder men see further gains. Here are some of the avenues they'll take:

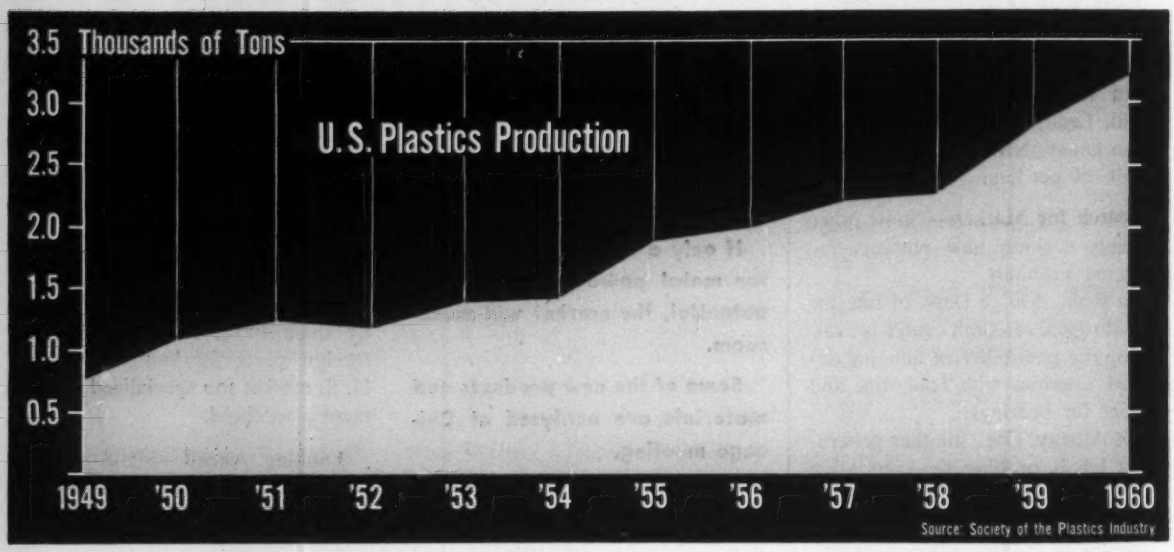
Slipcasting is a new technique. Fabricators report slipcasting (metal powder is poured as a slurry into a moisture-absorbing mold) usually causes shrinkage, makers holding tolerances difficult. But research reported last week indicates it may be the ideal technique to take advantage of finer powders.

Experimenters learned: The more powder fines in a slipcast part, the higher the density that could be obtained without pressure. It's already used in atomic applications, may move into other areas where high density is a critical requirement of the finished part.

More Markets—Another market with a strong outlook: A heat treatable and machineable titanium carbide, steel bonded, for tools and wear resistant parts. The finished part is a steel matrix, a 45 pct carbide, 55 pct steel mixture. The material lies between tool steel and cobalt-bonded tungsten carbide in its properties. It can be tempered for greater toughness, as is tool steel, but approaches tungsten carbide in hardness.

The material can be slotted, turned, drilled, tapped, and even contour-sawed at a faster rate than can steel of the same hardness. It's also been welded, using a heliarc; and can be selectively tempered.

Sintered nickel steel parts are now tempered to get 150,000 psi tensiles, and tensiles can be boosted to 168,000 psi, without difficulty.



Plastics Makers Push Research

Plans for an industry-financed institute for basic market and technical research are moving ahead.

Its studies would be important to the industry's growth and competition with metals. — By F. J. Starin.

▪ Plastics makers are putting the emphasis on research.

Early next month, primary and secondary plastics producers, converters, equipment makers, and even large consumers will be asked to support a Plastics Institute of America. Their reactions could affect the future growth of the industry and its ability to compete with metals.

Aims Listed—Aims of the institute are: Basic, but extensive, technical research; marketing research; spreading of the information developed; technical training.

Plans call for the Institute to be affiliated with a major university, as yet not selected.

How important would such an institute be? Professor Louis F. Raum, of Princeton University, chairman of the Plastics Institute Committee, told The IRON AGE that his group had already made a tentative listing of projects. "If only a few of these come through we will have more than justified our existence."

Another member of the committee, J. H. DuBois, chairman, Tech-Art Plastics Co., Morristown, N. J., says that if research could make certain mold improvements his company could more than double its business.

Favorable Prospects—What are the chances that the proposed Institute will get a favorable reaction? Very good.

First of all, while the committee won't be too specific until prospective members have been polled, it has firmed up a definite plan. The committee hopes to have the Institute underwritten until it "gets off the ground." They hope for a staff of 50 within 3 years.

That the advances envisioned by the committee would inject plastics further into some markets now dominated by metals is demonstrated by another committee member, Ralph L. Mondano, manager of Raytheon Co.'s plant at Maynard, Mass.

Test Case—Mr. Mondano says that plastics could better lick the heat barrier in re-entry of missiles and satellites into the atmosphere. He displays a sheet of plastic which conducts heat rapidly enough to be only warm to the touch after extensive exposure to a torch.

In direct contrast to metals, the plastic when heated goes directly from a solid to a gas, at a slow enough rate to be practical for a nose cone.

He also demonstrates another new plastic which he claims has better impact resistance "than any metal."

Industry's View — The eight members of the committee represent major companies in the areas in which they will solicit membership. For instance, A. A. Hutchings, F. J. Stokes Corp., a machinery maker, says equipment companies will be interested because the Institute would promote standards helpful in cost-cutting.

Steel Earnings Up, Outlook Down

First Quarter Profits Were Near Record

It will probably be a long time before steel earnings will reach the first quarter rate.

Price increases, once a foregone conclusion, are now doubtful.—By R. D. Raddant.

▪ Steel leaders (and stockholders and workers) looked back on top earnings for the first quarter and wondered how long before they will see another like it.

Earnings (see table) were universally good, with a few records and many near-records. But forecasts for the remainder of the year are nothing to cheer about.

How Far Down?—Most notable optimist, J. L. Mauthe, chairman of Youngstown Sheet & Tube Co., said he thought last week's operating rate of 79.4 pct of capacity might be the low point for the second quarter.

He was promptly challenged by National Steel's George M. Humphrey who said, "I see nothing in the picture to indicate that we have passed the low point and the rate could go lower."

Arthur B. Homer, president of Bethlehem Steel Corp., gave an industry operating rate of 80 pct for the year. He predicts declines through the third quarter and an upturn in the fourth.

Could Read the 60's—Roger M. Blough, chairman of U. S. Steel Corp., said the operating rate could drop into the low 70's, even the high 60's, before a fourth quarter upturn.

Significantly, Bethlehem's new orders booked in the first quarter were roughly only 66 pct of the first quarter billings.

With varying degrees of emphasis, the steel industry's executives placed the blame on the earlier-than-expected downturn on these factors:

Reasons Why — Inventory buildup, which ran from 6 to 8 million tons under what was expected.

High rate of orders for foreign steel, which could not be cancelled, and which reached this country at just the wrong time.

The better-than-expected return to full production and high rate of output following the steel strike.

Capital Spending Continues—Most of the steel companies voiced determination to follow through on capital spending plans.

Bethlehem increased its capital authorizations by $60 million in the first quarter. Mr. Homer said the rate of capital spending of $35 million in the first quarter will be stepped up sharply in later quarters.

But no significant increase in the industry's capacity will result this year. As Mr. Homer said, his company's capital spending is for the purpose of increasing efficiency and reducing cost.

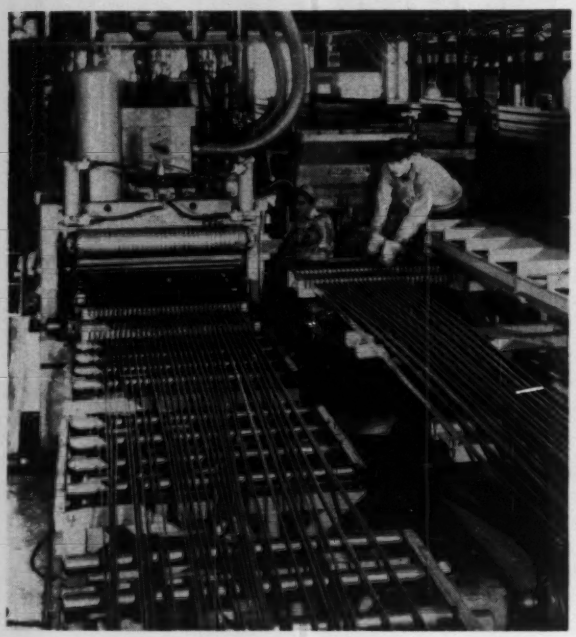
Cost Conscious—The industry's cost consciousness is more apparent than ever and capital programs are aimed at cutting costs through more efficient plants and equipment. Some capacity increases will occur, but only from added efficiency.

Prices, always a critical point, are more touchy than ever. A few months ago, most companies in the industry were sure that some increases were coming later in the year. There is no certainty now.

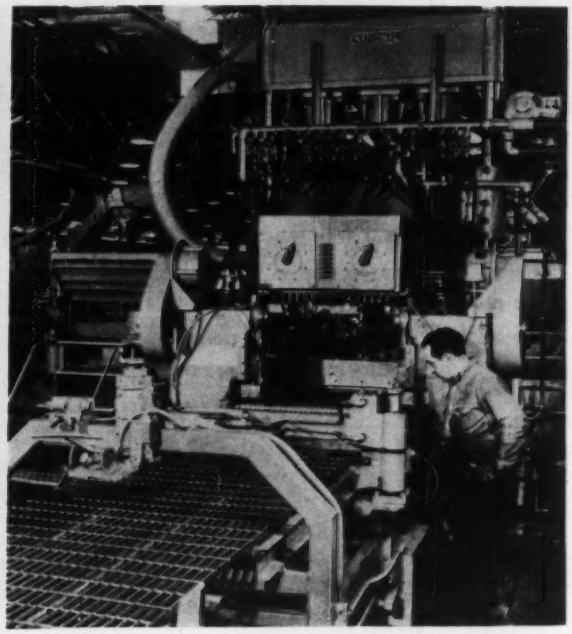
Steel Earnings—1960 versus 1959

COMPANY	First Quarter 1960	First Quarter 1959
U. S. Steel	$112,578,752	$106,585,303
Bethlehem	51,828,727	49,567,301
Republic	28,239,545	26,844,585
Jones & Laughlin	17,794,000	15,738,000
National Steel	17,718,342	16,504,090
Youngstown Sheet & Tube	12,891,248	11,541,884
Inland Steel	18,743,934	17,859,090
Armco	23,957,994	21,152,038
Kaiser Steel	6,687,000	3,303,000
Colorado Fuel & Iron	2,846,682	4,004,840
Wheeling	5,547,000	4,471,000
McLouth	5,826,974	4,192,028
Pittsburgh Steel	2,167,577	1,370,615
Granite City	4,320,655	3,484,763
Crucible	2,724,798	3,511,206
Lukens Steel	2,314,442	1,008,394
Detroit Steel	3,501,088	2,568,313
Allegheny Ludlum	4,791,584	4,549,542
Phoenix Steel Corp.	123,485	114,218
Alan Wood	854,995	965,264
Copperweld	1,389,174	1,501,255
Continental	1,135,414	1,081,030
Acme Steel	2,092,522	1,925,493

Grating Gets Automatic Welds



FEEDER LINE: Bearing bars are fed into automatic welding machine at Dravo Corp.'s industrial grating plant, Neville Island. Precise spacing and accuracy of dimensions are carefully controlled.



WHOLE PRODUCT: Finished grating panels emerge from welding machine after complete fusion of cross bars and bearing bars. Dravo says new technique results in greater strength, rigidity.

McDonald and Cooper Serve as Co-Chairmen

Joint industry-labor study of steel's working relationships is moving closer.

David J. McDonald, president of the United Steelworkers of America, and R. Conrad Cooper, executive vice president, personnel services, United States Steel Corp., will serve as co-chairmen of a new Human Relations Research Committee. They will also act as the official representatives for their organizations on the Local Working Conditions Committee set up in 1959 steel labor contracts.

Strike Outgrowth—The committees are the result of the disagreements between labor and management during the strike, especially in regard to work rules.

Companies involved in the studies are: Allegheny Ludlum Steel Corp.; Bethlehem Steel Co.; Armco Steel Corp.; Colorado Fuel & Iron Corp.; Great Lakes Steel Corp.; Inland Steel Co.; Jones & Laughlin Steel Corp.; Republic Steel Corp.; United States Steel Corp.; Wheeling Steel Corp. and Youngstown Sheet & Tube Co.

Others Named—R. H. Larry, administrative vice president, labor relations of USS, and Marvin Miller, assistant to the president, USWA, will serve as coordinators of the joint studies. They will be responsible for developing procedures to be used in studying the various issues before the committees. They also will plan and oversee the studies.

Each party plans to use additional representatives in one or more areas of study.

Taconite Suit Settled

Four years of bitter litigation between Mesabi Iron Co. and Reserve Mining Co. over taconite revenues has ended.

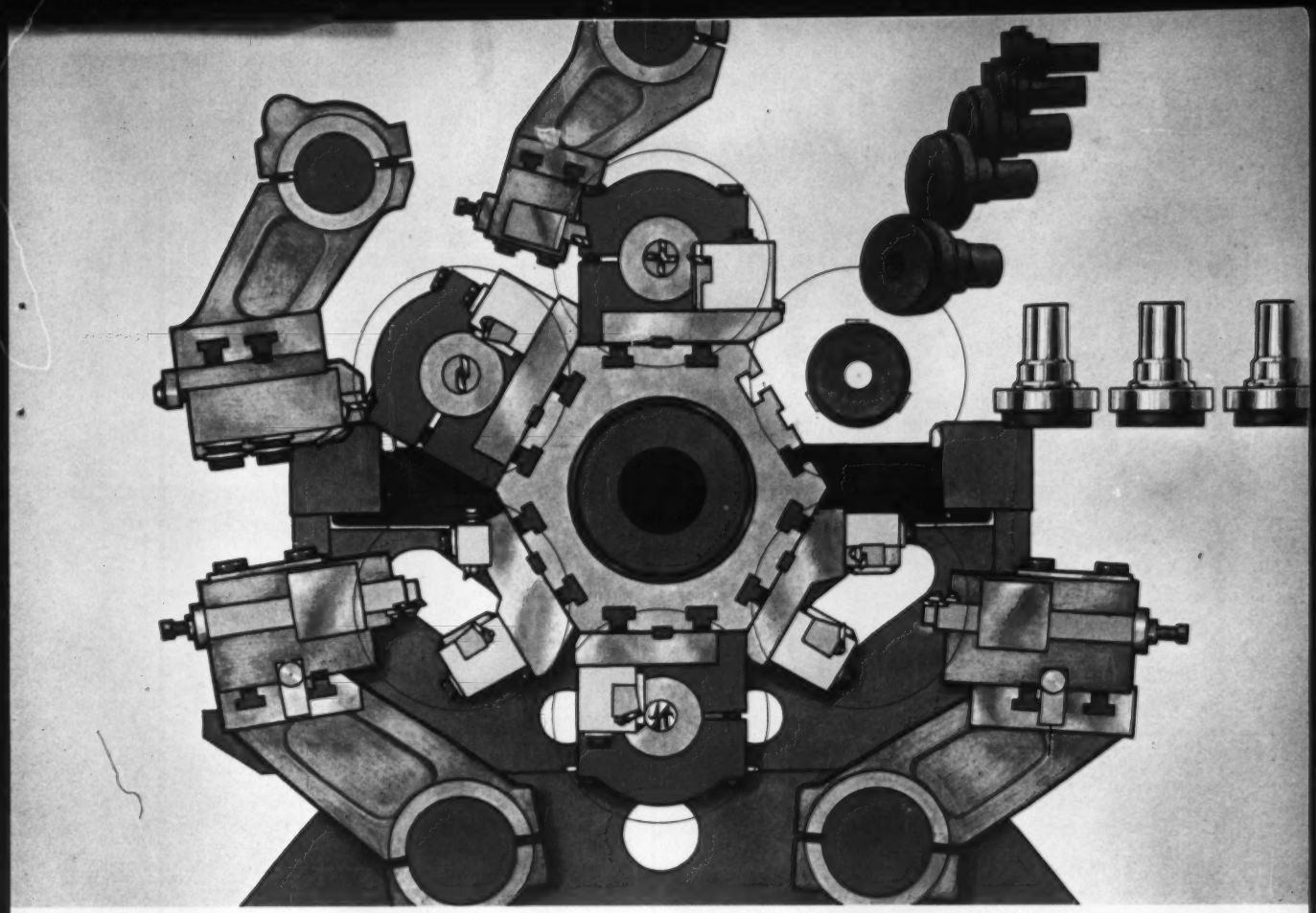
Mesabi stockholders approved a royalty agreement with Reserve that replaces a 1939 agreement. Reserve is jointly owned by Republic Steel Corp. and Armco Steel Corp. and mines taconite under lease from Mesabi. But the terms have been under dispute for some time.

The move will probably result in a dissolution of Mesabi, and prorata distribution to its stockholders of certificates of beneficial interest in a trusteeship.

New BDSA Ruling Stops Delivery Delays

A new ruling by the Business and Defense Services Administration, U. S. Dept. of Commerce, provides additional insurance against materials delivery delays which might hinder space, defense, and atomic energy projects.

The rules change, affecting BDSA Regulation 2, makes mandatory the use of priority ratings, which serve as defense identifications, in connection with acceptance and fulfillment of defense contracts.



Open secret of New Britain superiority

Wide-open design makes the most fundamental difference between a New Britain automatic chucking machine and other machines. It speaks for itself as a means of getting at the tooling, making adjustments and clearing chips.

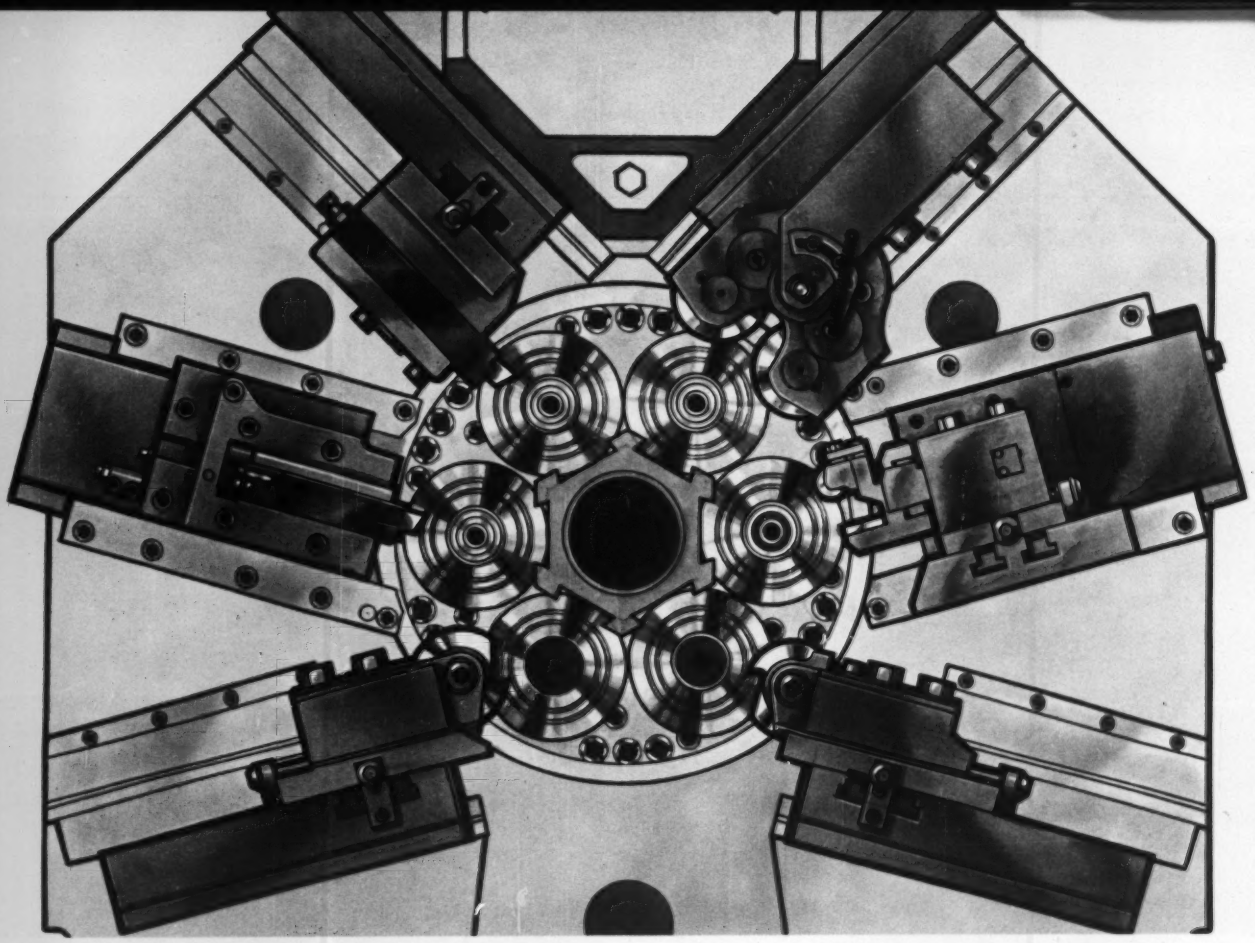
Massiveness, right from the floor up, is equally apparent and equally important in chucker work. You see it in the way the cutting tools make the heaviest cuts with a chatter-free smoothness that can't be duplicated.

Only New Britain provides a combination of longitudinal with transverse forming motion where needed. This versatility eliminates the need for second operation machines in many cases—particularly when a job is setup for double indexing for fast two-at-a-time production.

New Britain spares no pains to incorporate every new development to make chucker-type machining more profitable. The open-end design lends itself particularly well to magazine loading and unloading, for example, and many New Britains are being equipped to provide this feature.

Whenever a number of operations are required on cast or forged pieces, these massive, rugged, powerful machines offer great possibilities for savings through faster, more accurate, more reliable production. A new and complete catalog on the New Britain chucker line is just off the press. We would be very glad to send you your copy.

THE NEW BRITAIN MACHINE COMPANY
New Britain-Gridley Machine Division - New Britain, Connecticut



New Britain's answer to a serious threat

Overseas production of just about anything you care to name is making serious inroads on American domestic and foreign markets. It's no secret that European and Asian industry is catching up fast technologically—and they have a real competitive advantage in plenty of low cost skilled labor. While many foreign products are still inferior to those of domestic manufacture, this is far from true in all cases. The answer is, of course, increased productivity at lower cost.

In its all-new line of bar machines, New Britain has developed the most modern bar-turning units available. Five models in two different series are offered with capacities from 1¼″ to 5⅛″. These machines are designed for really fast, trouble-free, high-precision production. More operations per machine are possible than ever before. Wide open tool areas allow unlimited combinations of end working and forming tools. New Britains will stay new longer. The exclusive wear-preventing features so familiar to New Britain users have been retained and improved. Catalogs on both the small and large series machines are yours for the asking. After looking this literature over if you think one or more New Britains may help improve your competitive situation, we will be happy to review your prints and arrange a demonstration. No obligation, of course. Call us or call your local representative.

New Britain-Gridley Machine Division, The New Britain Machine Company, New Britain, Connecticut.

THE NEW BRITAIN MACHINE COMPANY

New Britain-Gridley Machine Division · New Britain, Connecticut

Maurice J. Day

He Merchandises Knowledge

M. J. Day, vice president, Crucible Steel Co. of America, is a firm believer in research.

Under his guidance Crucible has extensively improved its research program and benefited.

■ "You can manufacture and merchandise knowledge," says Maurice J. Day, vice president, commercial, Crucible Steel Co. of America.

Putting it another way, "Material is meaningless without knowledge."

The steady broadening of Mr. Day's activities reflects in part general recognition of these truths. A specialist in seeking out technical facts, his influence has grown as industry has come to see the need for new knowledge in all functions.

Research Grows—Mr. Day joined Crucible in 1954 after 15 years in varied metallurgical jobs for U. S. Steel Corp. and two years with Armour Research Foundation. He became research chief, taking over a department that had operated as a production auxiliary and employed less than 20 men.

Under Mr. Day, Crucible's research grew in size and stature. The staff was increased to 300 men. Research was placed on the same corporate level as sales and production. New equipment and advanced degrees beefed up the function.

Two-Way Extension—This growth was accompanied by an extension of research in two directions. First, vertical limits were moved outward.

Equally important, there has been a closer mingling of research with other departments. Production and sales are represented in the committee set up to steer research work. From an equipment standpoint, the laboratory has come to resemble the plant more closely.

MAURICE J. DAY: "Material is meaningless without knowledge."

"You now have research furnaces that are bigger than production units," points out Mr. Day. "And developments like vacuum melting have found technical men serving as operators."

Official Recognition—The spreading influence of research was officially recognized in 1958 when Crucible set up a technology department with Mr. Day as its head. The move centralized responsibility for applying new knowledge to production and field service as well as research.

From this point, Mr. Day last year moved to his present job as head of commercial activities. Personal qualities as a leader and administrator were factors in the assignment. But the move also recognized the importance of technical knowledge in steel merchandizing.

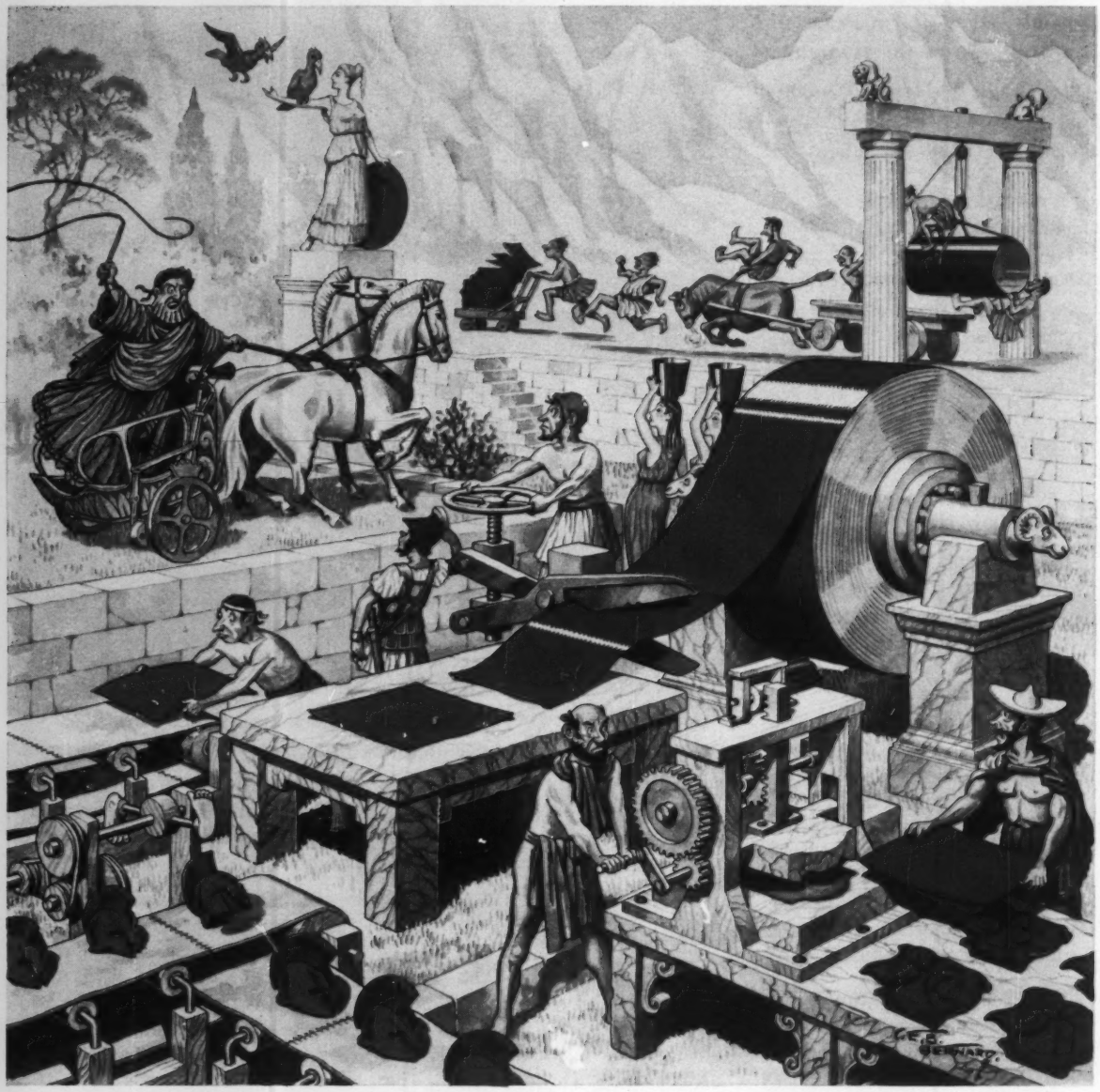
Optimistic Outlook—For the immediate future Mr. Day is optimistic about the chances for a record year. In the tool steel field, where Crucible is the nation's largest producer, he calls demand encouraging but he sees problems arising from "gross overcapacity." For stainless he sees a need for intermediate grades to fill product gaps.

Looking further down the road, he sees broad, rapid progress. "I believe in a very short time it will be a common thing to specify materials that can only be made by vacuum melting."

Now it can be told

This engraved marble tablet recently uncovered in one of the long-lost Phrygian caves shows how Midas fooled the public. This stuff wasn't 14-karat at all. The "Midas Touch" is nothing but a myth. Midas used ColorRold* Stainless Steel, developed by Washington Steel Corporation. Gotta give the old charlatan a lot of credit though—he knew a good thing when he saw it.

MIDAS SPECS: 2 cubits × .025′ ± .001′ × coil, Type CCCII (302), Rb 82 max. Sunbrite gold, 50 glossimeter, 1 mil, paper interleaved, skidded for open oxcart only. 12 × 10^6 drachma max. wt. per coil.



ColorRold, an organic coated stainless steel, comes in eleven harmonizing colors, can be formed and drawn or textured and highlighted in an infinite number of designs and effects, now available for your architectural or product needs.

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Tight Money Complaints Grow

Businessmen claim the credit pinch is partly responsible for the sales slowdown.

Tight money problems hamper the buying plans of both manufacturers and consumers.

■ Sagging sales are not the only cause for concern when businessmen talk about the current slowdown.

Tight money is taking some of the blame for the business lull. Construction is hampered by the impact of the money squeeze on the mortgage market. Consumer buying plans are made more difficult. But the direct effect of tight money on industrial buying is also hurting.

Cut Too Fine—Inventories are, of course, being adjusted to fit the sales curve. But sometimes the red light on buying is coming from the comptroller's office as well.

Buying halts dictated by company finances are hampering buyers. Blanket orders to cut back may include items still in short stock—and critical need.

The money pinch also makes it difficult for small businesses to finance goods going right into production. The search for bank financing can be long and difficult.

How Much Is Enough?—In all these cases, tight money is a negative influence — putting a damper on the boom. Yet deciding how much money and credit is enough — as the Federal Reserve Board does—is a difficult task. Restraint brings complaints that business is being hurt. If money is made more available, the dangers of inflation increase.

Those arguing money is too tight generally point out prices are now fairly stable. This has been largely true in the last year.

More Price Movement — Yet prices are again showing signs of advancing. In March the Labor Department's wholesale price index made its greatest increase in two years. And Labor Department economists feel that both wholesale and consumer prices will rise more than 1 pct this year.

So the FRB's job is to weigh the various factors, then strike the right balance.

Balancing Difficult — "Balance" in money policies and other economic areas is taking plenty of effort this year. There is the drive underway to improve the U. S. balance of payments in international trade. This has brought about the government's current plan to expand the volume of U. S. exports.

There is the effort to balance inventories in relation to sales. Each acts on the other. A brisk rate of production creates a shipping momentum that piles up inventories even after sales start to slacken.

"Rolling Prosperity"—And there is the balance in a boom as some factors act to push it along while others hold it back. This creates what C. Canby Balderston, vice chairman of the FRB's Board of Governors, calls "rolling prosperity." There are forces, he adds, which can threaten business stability when it is at high levels.

Among these he lists: Changes in inventories and plant construction plans; changes in the rate of consumer installment and mortgage debt; the pricing policies of business; the wage demands of labor; and variations in profits.

Construction Lagged in March

■ Construction is still not showing all of the strength expected of it earlier.

Contract awards in March were again behind year-ago levels, according to F. W. Dodge Corp. But the company's economists say the month showed some improvement over January and February. And within a few months awards should equal or pass those of the corresponding months in 1959.

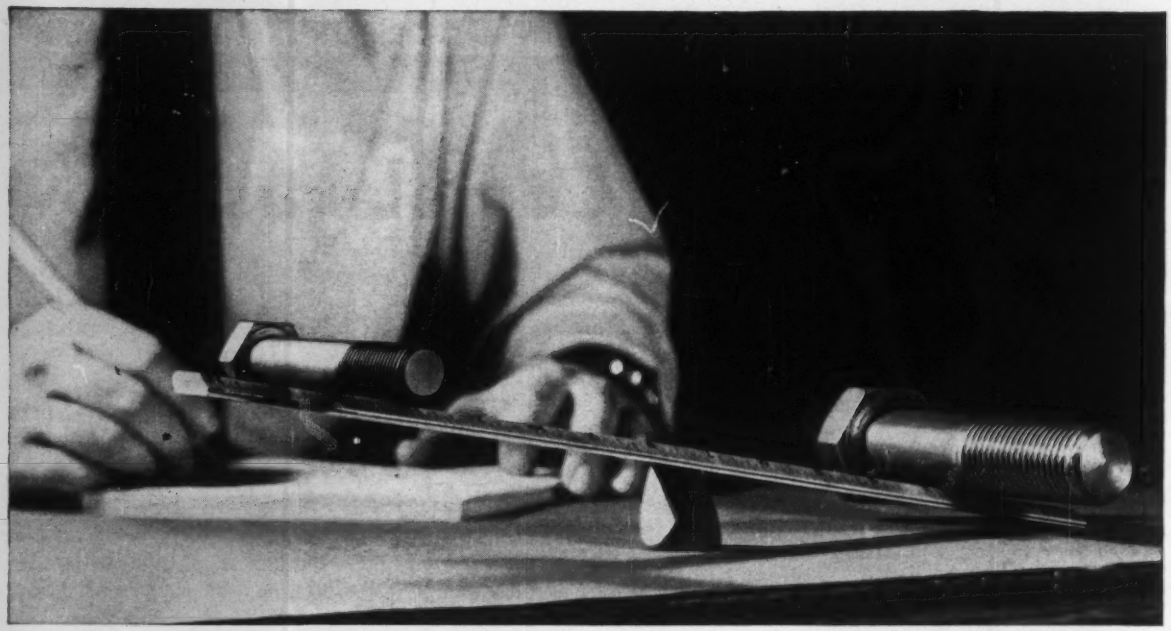
March awards were 9 pct below those of March, 1959. Dodge points out. On a first quarter basis, awards this year are 6 pct below the first quarter of 1959.

Housing Down — The March decline was lead by a drop in residential construction. In dollar volume, these awards were 16 pct below those of the previous March. For the first quarter, housing awards were off 12 pct.

Exports Hit Two Year High During March

Commercial exports in March were at their best level in over two years, Commerce reports.

Preliminary estimates place shipments of goods (other than military aid) during March at $1.67 billion. This was the highest figure since October, 1957 when they were $1.66 billion.



Weighs a 64% cost reduction

Fastener survey by RB&W seeks to deliver maximum holding power per fastener-dollar ... makes possible substantial savings

Since the job of a standard fastener is mainly to hold an assembly together, its *"clamping force"* is what you really want. You can reduce costs by applying this fact and buying fasteners by their *holding power* rather than size.

For example, compare SAE "proof load" and cost ratios of four different hex screws of standard steels.

Grade	SAE Grade 5	SAE Grade 2	SAE Grade 2	SAE Grade 2
Size	¾ x 5"	1 x 5"	1⅛ x 5"	1¼ x 5"
Proof load (lbs)	28,400	16,950	21,350	27,100
Cost Ratio	100%	188%	239%	277%

Almost unbelievable. The smallest—the heat treated RB&W High Strength Hex Screw—exceeds all the others in load capacity, can usually be used instead of any of them. But, since it's smallest and weighs less, it also costs you less. 64% less than the 1¼" Grade 2 screw; 58% less than the 1⅛", etc. And because holes can be made smaller, you save on production, too.

Want to get the most from *your* fastener dollars? Let a specialist who best knows the subject of fasteners contribute his knowledge to that of your engineers. Contact Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N. Y.

RB&W
115th year

Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. Additional sales offices at: Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. Sales agents at: Cleveland, Milwaukee; New Orleans; Denver, Fargo. Distributors from coast to coast.

Buyers Warm-Up to Car Coolers

But Compacts Put the Chill on Really Hot Sales

Every year more and more new car buyers are getting air conditioners installed.

This year will be no exception. But economy-minded compact car buyers won't help swell the total. — By A. E. Fleming.

■ With hot weather on the way, the auto industry is getting ready to cool off a growing number of customers.

Estimates are 700,000 air conditioning systems will be installed in domestic automobiles in calendar year 1960. In 1959 around 580,000 units were sold. These included 340,000 installations at car assembly plants, 160,000 at independent service shops and 80,000 at car dealerships.

This represents a lush dollar market for auto producers, since the retail price of a cooling package runs from about $250 to $700. The average is in the $350 to $400 area.

Cool Markets—All concerned—car makers, service shops, dealers and suppliers of air conditioning components—view this fast-rising accessory market with eagerness. Taking an edge off the the optimism, however, are compact car sales, which are taking larger parts of the new car market. Compacts don't form a strong market for car coolers because of the economy factor. Last year, for example, air conditioning was put on less than 1 pct of Studebaker Lark factory output.

But the air gets cooler the higher up the price scale you go. Officials in the luxury-price group—Cadillac, Imperial and Lincoln—predict that half their cars will leave the assembly lines with air conditioning this year. Cadillac had the highest percentage in 1959, about 40 pct. which came to over 50,000 units.

Climbing Fast—The top volume installers last year were Chevrolet and Ford, with almost 80,000 units each. They expect to top that in 1960. The medium-price models won't stand still either. As an example, Pontiac officials say air conditioning installations in 1960 models are up 52 pct over last season, standing at 10.6 pct of 1960 model output to date compared to 7.5 pct in the complete 1959 model year.

Although the air conditioning market is growing, it's far from fully developed. According to the Automobile Manufacturers Assn., 4 pct of all cars owned by Americans in the spring of 1959 contained air coolers. They were in 8 pct of all 1959 and 1958 models on the road, 6 pct of 1957 and 1956 models, 4 pct of 1955-54-53-52 models and 2 pct of pre-1952 models.

Why the Demand—How fast the percentage will grow in coming years is difficult to gage. But one car maker, Chrysler, expects to double its rate by 1963.

Chrysler air conditioning nearly doubled in the past three years. It rose from 8.7 pct in 1957 to 16.7 pct through last January. At

What Floats? The Amphicar, Of Course

LIKE A DUCK: New German-built floating car will be imported by Amphicar Corp. of America, New York. It has a top land speed of 90 mph. Twin propellors will push it through the water at 14 knots. The versatile vehicle will be priced under $3000.

the same time, Imperial jumped from 29.9 pct to 43.6 pct. Chrysler engineers say getting rid of road and wind noise, elimination of dust and pollen for persons with allergies and better dehumidification are factors in the increased demand.

Aluminum Market?—Aluminum producers are eyeing the auto air conditioning market. Aluminum Company of America says that in cooperation with Tecumseh Products Co., Tecumseh, Mich., it has shown that aluminum die and permanent mold castings could replace iron parts with "substantial savings." Tecumseh is one of the country's largest compressor manufacturers.

Alcoa says aluminum performs well at temperatures up to 400°F., and under extreme pressures generated in a compact compressor unit.

The average cast iron and steel compressor weighs about 51 lb. By using aluminum castings in pistons, connecting rods, cylinder heads, crankcases and motor mounts, Alcoa reports weight was cut in half. Total aluminum usage runs 11 lb per unit.

Condenser Project — Alcoa also worked on developing the first all-aluminum auto air conditioner condenser, along with Modine Mfg. Co., Racine, Wis. Alcoa says its aluminum fin stock and rectangular tube has the desired lightness and high heat conductivity.

During assembly, aluminum tubes and fins are metallurgically bonded by a special process. Core of the aluminum unit weighs under 7 lb and is less than 1 in. deep. A comparable steel unit weighs 30 lb. The aluminum condenser is said to keep cars cool in temperatures up to 130°F.

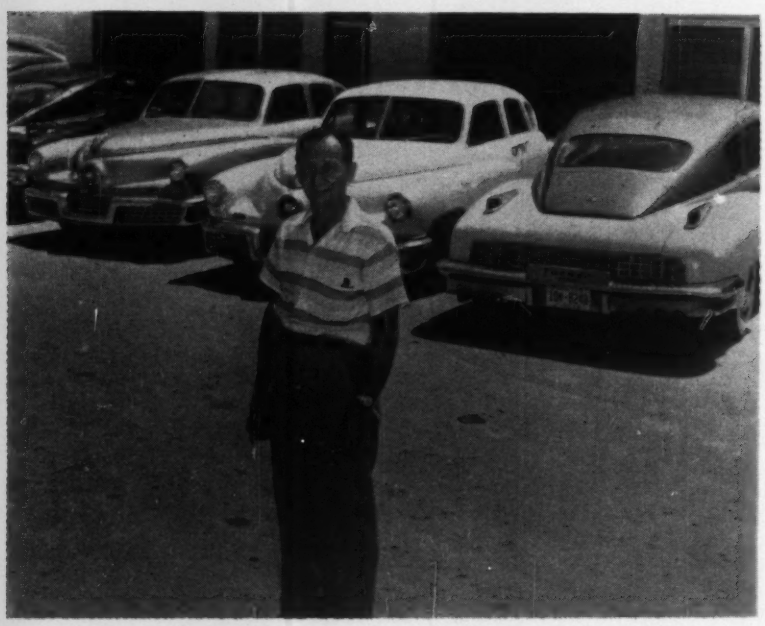
Design Considerations—Keeping passengers comfortable in hot weather, however, can involve more than an air conditioning unit. W. H. Jackson, of General Motors Corp.'s Harrison Radiator Div., says car design can play an important part in cooling passengers. The car body has about 150 cu ft of passenger space enclosed by sheet metal and glass.

He says head lining, door trim panels and carpets offer insulation from outside heat. Some car makers provide added floor insulation for air conditioned models. Mr. Jackson says floor insulation in an air conditioned car can mean up to 3°F cooler temperatures inside the car.

Cool Colors — Cooling involves color, too. Mr. Jackson says interior temperatures of cars parked in the sun one hour have tested up to 15 degrees cooler in cars with light color exterior paint compared to dark colors.

Glass is another factor. Road tests show tinted or shaded glass provides 5 degree cooler temperatures inside the car. Seat materials that "breathe" also can provide additional passenger comfort.

Who Can Remember the Tucker?



TRICK OR TREAT?: Yes, Virginia, there really was a Tucker car. In fact, N. R. Jenin (above), of Fort Lauderdale, Fla., owns 10. One has gone 100,000 miles. The Tucker and its troubles are the subject of a new book, "The Indomitable Tin Goose," by C. T. Pearson.

Israel Exports Autos and Parts

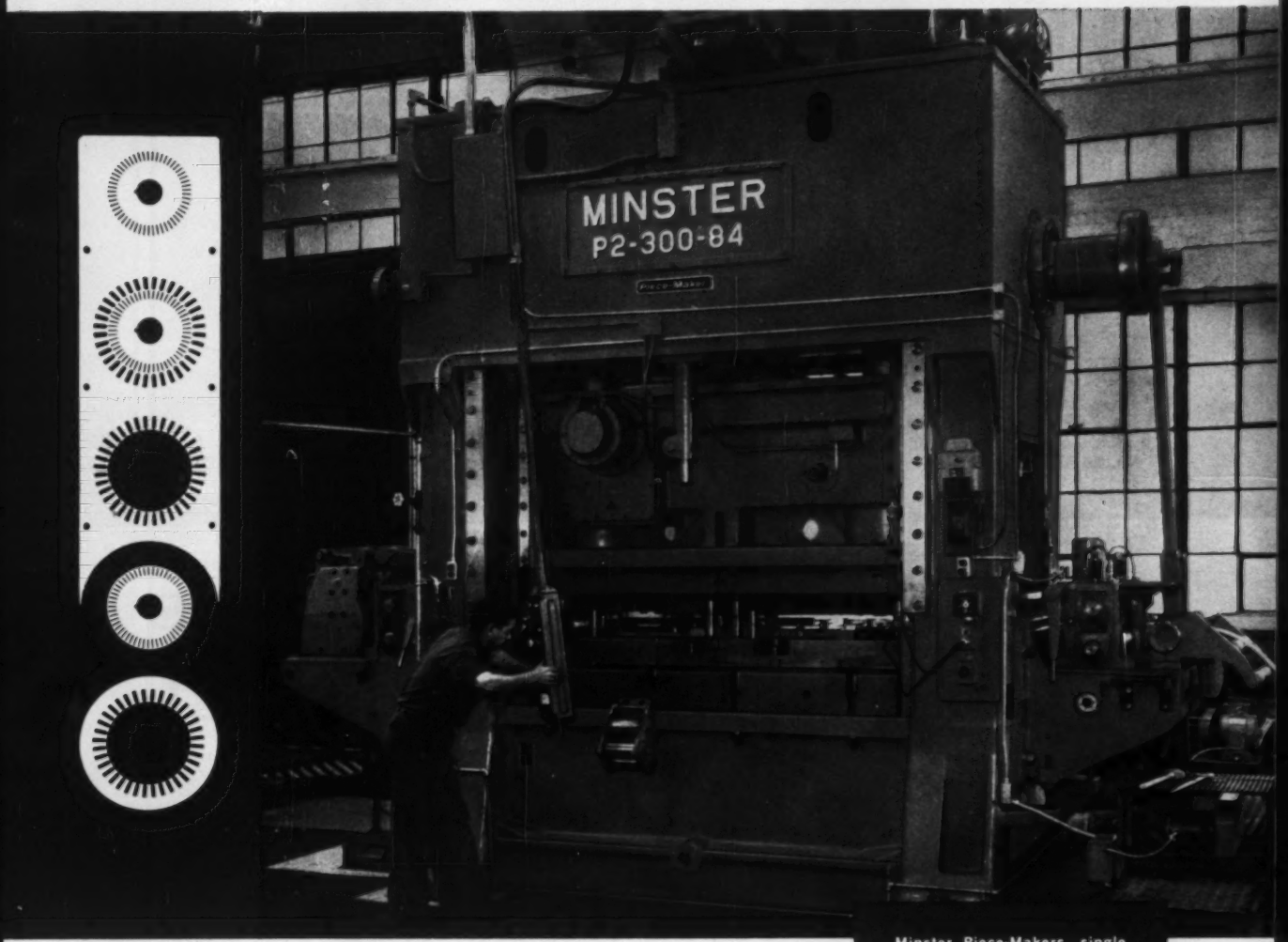
Israel plans to boost exports of automobiles and parts this year. It now exports some parts to the U. S. These include brake linings for cars and brake blocks for trucks, clutch facings, tires, asbestos yarns for brake lining, mufflers, and gas tanks.

Total value of these parts exports came to about $150,000 in 1959. The country hopes to double that this year.

Autocars Co., Ltd., Haifa, expects to ship 600 lightweight Sabra station wagons for the American market this year. The five-passenger vehicle has a 36 hp engine and a fibreglass body. Retail price is about $1900 at New York City.

The company also produces a delivery van and an open pickup truck. An experimental sportscar has been built in Haifa. Production is expected to start in a few months.

AUTOMATIC PRODUCTION profits pay for the press



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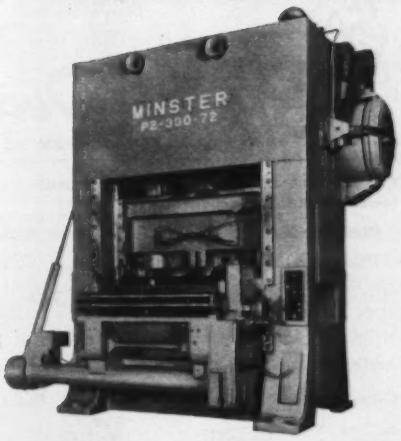

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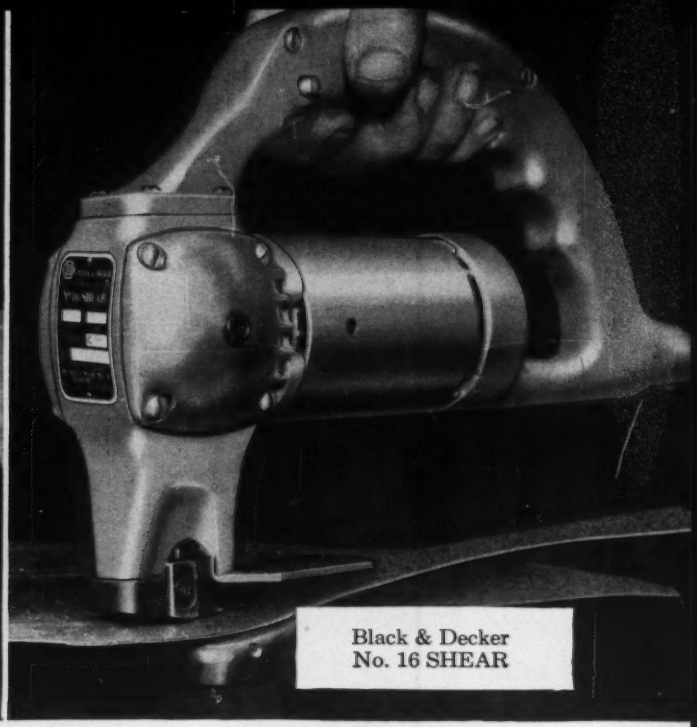
No. 16 NIBBLER



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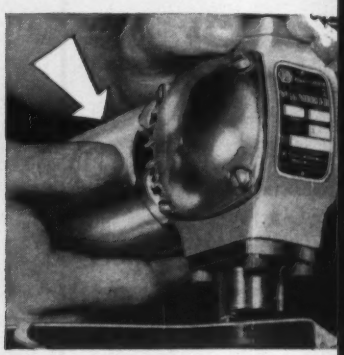
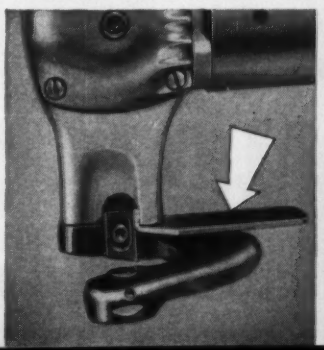
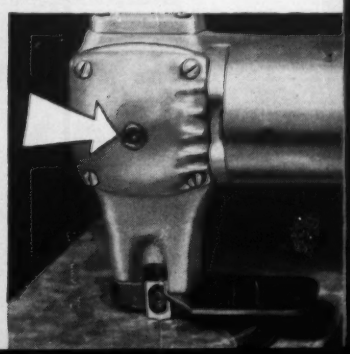


UP TO 3 TIMES FASTER than competition, new B&D Nibbler has twice the life, 20-30% less weight, reversible punch. Adjustable stripper plate (left), smaller diameter (right) are extra features.

50% FASTER than competition, new B&D Shear has one-third less weight than closest competitor, lasts much longer. Deflector plate prevents curling of material. Adjusting screw allows quick positioning of blade.





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Business Drop Worries Capital

Administration Concerned About Political Effects

Spokesmen from the White House are pooh-poohing adverse business talk, hold to earlier predictions.

Another concern is prices, which show signs of continuing uptrend.—By G. H. Baker.

■ Administration officials are alarmed over the reports of reduced operating rates in steel, automobiles, and other basic industries.

This kind of "scare talk" could be fatal to politicians seeking election or re-election in November.

Say It Isn't So—To counteract these reports, Administration spokesmen are pooh-poohing the reports of slow manufacturing activity by pointing out that 1960 is going to end up as the best year ever for most industries.

Steel and automobiles undoubtedly will have good years, although well below early hopes. But farm machinery and steam turbine electric generators and power boilers are experiencing sub-normal productivity activity.

Scare Talk?—In steel, for example, the government predicted at the beginning of 1960 ingot production this year would approximate 125 million net tons, barring strikes.

"We see nothing in sight that will cause us to revise that figure downward by any substantial amount. We find it hard to understand why some writers and economists are crying the blues about how we're headed for a recession. This is nonsense. Only those who either don't know what they are talking about or those who are trying to scare people out of voting Republican are spreading this kind of talk," is the official word.

Price Problems—It will be interesting to review the Administration's 1960 forecasts for the metalworking industries in December to see how close they came to hitting the target.

Despite the abundance of goods of every description, from steel to food products, there is still talk here about price stiffening. Some government economists are now saying that a new round of inflation is in the making. They cite the increases in wholesale prices during March and April, and point out that rises in wholesale prices inevitably are advance warnings of price rises at the retail level.

Seasonal Factors—The Bureau of Labor Statistics wholesale price index shows that wholesale prices climbed to an all-time peak in March, reflecting higher prices of farm products. The gain was 6/10 of 1 pct, the largest increase in two years. It is conceded, however, that food prices usually go up in early spring, reflecting end-of-winter scarcities. The consumer price index rose too, by 1/10 of 1 pct. If the experts are right in their observations, consumer prices are headed for another rise next month, perhaps much larger than 1/10 of 1 pct.

Price stability has long been one of the Eisenhower Administration's goals. But in the absence of government price control, price rigidity is not easy to achieve. After all, the government - dictated wage settlement in the steel wage case early this year still stands out as one of the chief factors contributing to increased costs.

All for Better Labor Relations

Top leaders of labor and management are expected to meet next month in a summit conference on better understanding between unions and employers.

The conference series was proposed by President Eisenhower. The President will ask Rudolph Bannow, president of the National Association of Manufacturers, to name three leading business executives to represent employers at the talks. He already has asked AFL-CIO President George Meany to name three union representatives.

Government Hands Off — Labor Secretary James P. Mitchell said the government would not participate in the talks. "The conference will be the sole responsibility of labor and management," he said.

Mitchell expects the results of the conferences to be better understanding of such issues as: (1) Maintenance of industrial peaks, (2) inflation and price stability, (3) automation, and (4) foreign competition.

Step-By-Step—The first six-man committee will develop an agenda, select additional conferees if they wish, set the time and place of the first meeting and decide any other matters relating to the proposed series.

Mitchell said it is hoped that there "will be no end to these conferences." He hopes additional meetings will be set up for individual industries at which the industry's employers and labor leaders can discuss common problems.

NORTHERN Cranes for production

Repeated selection of Northern Overhead Electric Traveling Cranes in high production plants is evidence of their dependability in providing long-term, low-cost, heavy duty service—fast, accurate operating control—minimum downtime for maintenance—maximum safety—and three-shift service seven days per week when required. For additional information call your nearby Northern representative, or write or call Northern's main office.

These four Northern Cranes, each of 25-ton capacity (with 10-ton auxiliary hooks) and 116-foot span, are operating in a large, integrated automotive press plant. Each crane has 8-wheel compensating end trucks, full length footwalks on both girders, and rotating steel handling equipment.

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More Aluminum Due From Farwest

Harvey Aluminum Plans Big Expansion

Program to expand its aluminum output and fabricating facilities will cost Harvey Aluminum over $85 million.

Included will be equipment to make billets, bar, rod and wire rod.—By R. R. Kay.

■ Another huge aluminum expansion is set for the West Coast.

Harvey Aluminum, Torrance, Calif., is embarking on a program that will cost over $85 million. It could reach $100 million.

Here's a rundown of the company's plans for its aluminum reduction plant at The Dalles, Oregon:

Increase capacity from 54,000 to 67,000 tons, and install new fabricating facilities. Cost: $12.6 million. Spend $30 million for an alumina plant and $40 million for a rolling mill with a 60,000-ton capacity.

Products Included—Harvey now gets its alumina from Japan. But it's looking for new sources of bauxite in British Guinea and Jamaica.

The fabricating facilities at The Dalles will include equipment for billet casting and wire rod making. The Torrance plant will get a bar and rod rolling mill to produce aluminum conduit.

When Harvey opened The Dallas in 1958 it became one of the six producers of primary aluminum in the U. S. Last year it turned out 58,000 tons.

The company makes products for a wide variety of industries. Sales for Harvey's last fiscal year ran over $60 million.

New and expanding plants are sprouting up all over California.

In San Jose, just south of San Francisco, $1.5 million is going into a new plant for the American International Aluminum Corp. The firm will make aluminum extrusions.

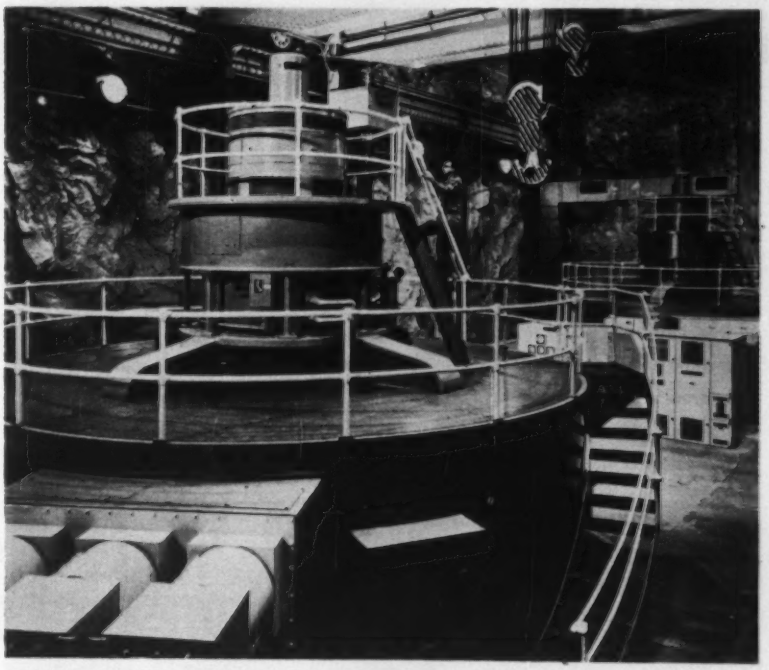
Nearby Palo Alto gets deeper and deeper into electronics work. Ampex Corp. expects to spend $7.6 million for a 350,000 sq ft plant to make magnetic tape recorders. Varian Associates will put $1.2 million into an 81,000-sq-ft radiation and vacuum products factory. A 30,000 sq ft research facility is in the works for General Electric Company's Computer Laboratory.

A. B. Dick Co. leased more space for an electronics research laboratory. And Inter-Continent Engineering Co. plans a $1 million plant for its electronics products.

Plants at San Jose—Also going up in the San Jose area: New facilities for Franciscan Engineering and Manufacturing Corp., machine shop; Bel Air Industries, Inc., raised metal flooring; Special Metals Supply, Inc., coiled metal processors.

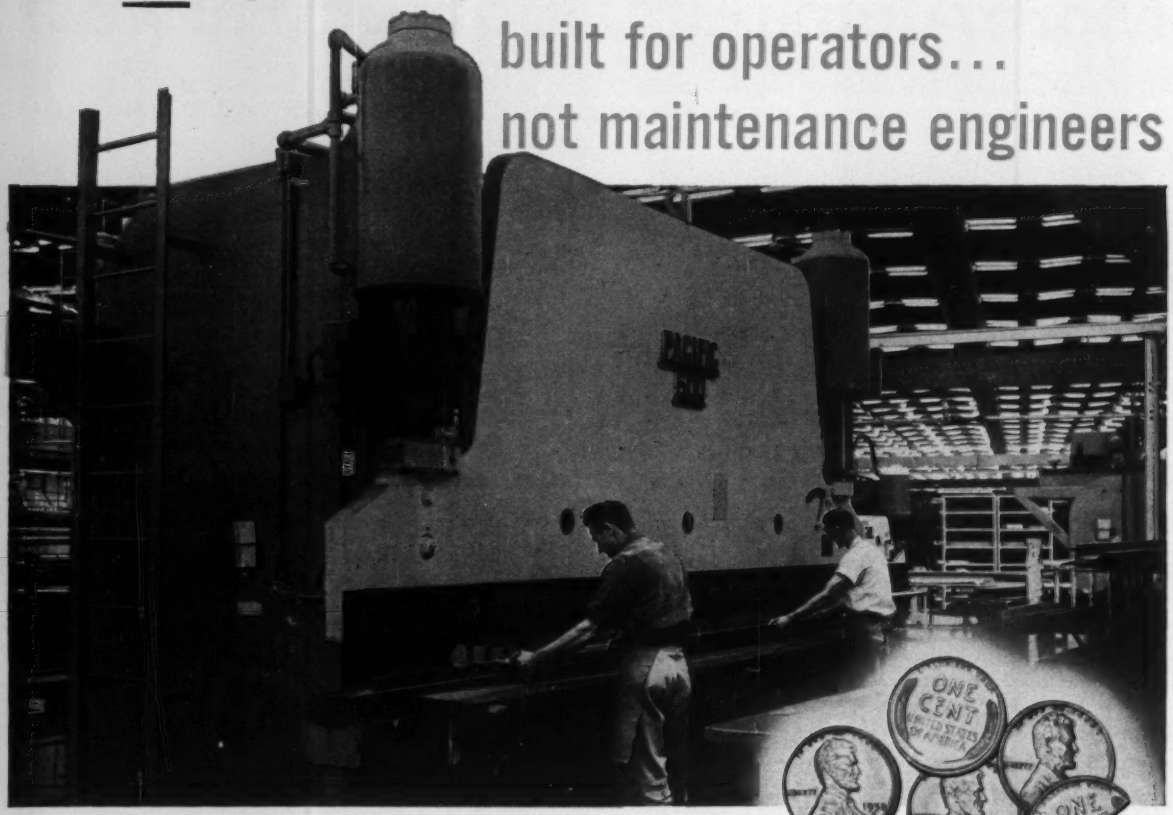
In southern California, Telecomputing Corp. will move its Whittaker Gyro Div. into a new Chatsworth factory. In Burbank, Tevco Insulated Wire is making more room for production of its industrial electronic and automotive plastic insulated wire.

Hole in the Ground Saves a Million



CARVED FROM ROCK: Pacific Gas & Electric Co. saved a million dollars by building its Haas hydroelectric power plant entirely underground. Plant location was carved out of solid rock 500 ft below surface. It's located on the Kings River, California.

The one hydraulic press brake built for operators... not maintenance engineers



To all outward appearances many hydraulic press brakes may *seem* alike but that is where the similarity ends. Inside the PACIFIC is the most sensibly simple, patented level control system ever devised . . . only 6 microswitches and 2 relays provide the precise PACIFIC accuracy that no other hydraulic press brake can even remotely approach. Free of lineal variable differential transmitters, electronic amplifiers, photo-electric relays, amplidyne generators, complex hydraulic servo-valves, variable volume pumps and other complicated gadgets, PACIFIC hydraulic press brake can be kept in continuous operation by the ordinary plant maintenance man without the costly services of a professional hydraulic or electronic engineer from some distant factory. PACIFIC can be maintained for pennies per operating hour . . . only a fraction of the cost of the complicated machines.

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Exports Bolster Tool Market

Foreign Orders Make Up 24 Pct of 1st Quarter Total

For the third straight month, foreign orders for machine tools showed an increase.

And over the past six months, they account for 21 pct of all new orders.—By R. H. Eshelman.

■ There's at least one bright spot in the current market picture for machine tools. That's the recent rise in sales of American machines abroad.

This fact was pointed out by Ludlow King, executive vice president of the National Machine Tool Builders Assn. in a speech at the annual Westinghouse Machine Tool Forum.

NMTBA figures show that, for the third straight month this year, new orders for metalcutting machines moved up a notch, reaching $49 million in March. New orders for the first quarter topped the $140 million mark. This is at an annual rate of $560 million. By comparison, 1959 was only a shade above the $500 million mark.

Aid From Exports — Mr. King noted that one of the most interesting developments in the industry, however, is the improvement in export orders. March export orders of $12 million bring the first quarter export sales up to nearly $34 million. This is 24 pct of total net new orders.

Over a longer range, he pointed out, export orders for the past six months account for a sizeable 21 pct of the total. This picture hasn't been so rosy for some time.

According to Mr. King's figures, export orders were about 13 pct of the total in 1959, 17.2 pct in 1958, 11.1 pct in 1957, 10.3 pct in 1956 and 8.7 pct in 1955. He added that much of this export business was in the field of special purpose machines. This is taken as evidence that U. S. machine builders are still in the lead in the design and construction of automation equipment.

Westinghouse Announcement — Mr. King cautioned against undue optimism, however. He warned that both labor and industry face important crises in the next 18 months. "Our greatest difficulties in world markets today are because of our high wage rates."

He said that labor must soon decide whether to temper unjustified demands, or face a growing exodus of jobs. Although U. S. machine builders are still ahead in technical advances, Europe is rapidly catching up.

In other developments at the meeting, Westinghouse announced its entrance into the numerical control field.

Norton Develops Synthetic Diamonds

CARAT COUNTER: Dr. P. P. Keat, senior research engineer, prepares to examine Norton Co.'s man-made diamonds under a microscope. Dr. Keat is a member of the team which developed this artificial diamond.

INDUSTRIAL BRIEFS

Employee Award—The New Jersey Zinc Co. is sponsoring a $1000 cash award for the employee who contributes the most successful design and production of a part. The award will be known as "The New Jersey Zinc Co. Zinc Die Casting of the Year Award." Presentation will be made at the annual dinner of the American Die Casting Institute Sept. 14.

New Buildings—Construction is under way in Weirton, W. Va., for a new National Steel Corp. Research and Development Center and also for a new general office building for Weirton Steel Co., a division of National Steel. The buildings will be situated on a 375-acre tract of land east of the Woodland Estates section of Weirton. Research at the center will be in five basic categories: Basic research, materials research, process metallurgy, physical research, and product research.

Modernization—Blaw-Knox Co. will spend between $12 and $15 million in a new modernization program. The program, soon to be developed in detail, will be centered largely in the company's major properties serving the metallurgical industries.

Agreement — Lobeck Casting Processes, Inc., of New York has concluded a marketing agreement with Sheppard & Son, Ltd., to market Sheppard ingot casting machinery. The range of Sheppard machines covers both single and multiple-strand units, to handle such metals as iron, aluminum, zinc, lead, copper, nickel and their alloys.

Plant For Sale—Pullman-Standard, a division of Pullman Inc., will sell its Worcester, Mass., passenger car plant. The plant, covering 52 acres, with 600,000 sq ft of buildings under roof, has been on a standby basis since December, 1958, when it completed its latest order for railroad cars.

Ordnance Contract—Air Products, Inc., Allentown, Pa. has a $1.8 million contract from the U. S. Army Ordnance District, Philadelphia. It is for the production of semi-trailers in support of the Jupiter Guided Missile Program. The trailers will have a 4000 gallon capacity. Production will begin in September and is scheduled for completion by Feb., 1961.

Aluminum Pig Design—A redesigned aluminum pig has been developed by Aluminum Co. of America. The 50 lb pig has a new design that assures maximum safety and stability when stacked. New features are a side-by-side interlocking notch, and flat, sloping sides. All bundles are wrapped with four metal straps.

Trade Name Change—The trade name of Cincinnati Bickford radial and upright drilling machines has been changed to G&L Bickford. The new name also will be applied to universal radial drilling machines built by Giddings & Lewis in Kaukauna, Wis. Giddings & Lewis has owned the Cincinnati Bickford line of drilling machines since 1955.

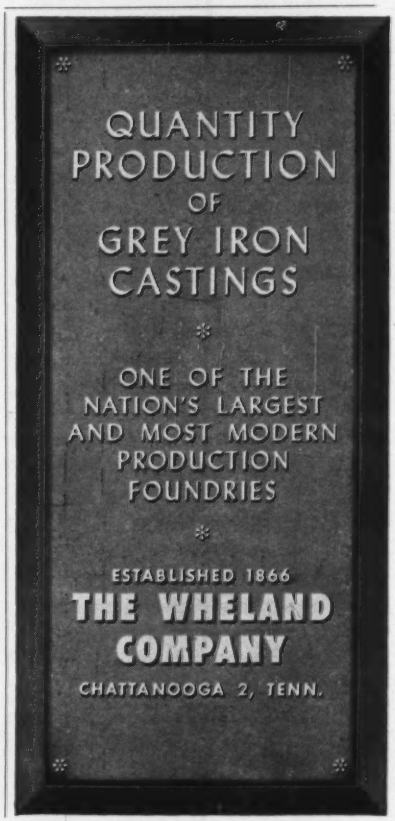
Army Contracts — Significant Army contracts recently awarded: Hercules Powder Co., a $9 million contract for production of propellant and explosives and plant maintenance at the Radford, Va., Arsenal; Sperry Rand Corp., a $5 million contract for R & D on the Sergeant missile system; Ford Motor Co., more than $2 million for 1638 light sedans.

Officers Elected — Mr. R. D. Thomas, Jr., president, Arcos Corp., has been elected president of the American Welding Society. Other officers are A. F. Chouinard, director of research and development, National Cylinder Gas Co., vice president; J. H. Blankenbuehler, design engineer, Hobart Brothers Co., vice president; and C. E. Jackson, of the Linde Co. Development Laboratories, vice president.

Foreign Plant — Doehler-Jarvis Div. of National Lead Co. has established a Brazilian subsidiary offering complete diecasting and plating facilities to Brazilian industry. The subsidiary, Industrial Doehler do Brasil, S/A, will be located at Sao Paulo.

Foreign Agreement — Clark Equipment Co. International, C. A., has negotiated a manufacturing contract with Andrews & Bevan, Christchurch, New Zealand, for production of Clark's line of industrial fork trucks. Clark International is a subsidiary of Clark Equipment Co., Buchanan, Mich.

Acquisition—Raytheon Co., Norwood, Mass., has signed an agreement to purchase Garlynn Engineer Co. of San Francisco, Calif. The Garlynn acquisition would enable Raytheon Marine Product Operations to broaden its product line by adding precision electronic, electro-mechanical and instrumentation devices.



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W. R. Timken, elected president, The Timken Roller Bearing Co.

Baldwin-Lima-Hamilton Corp., Electronics and Instrumentation Div.—**R. O. Bullard,** elected as vice president and general manager, Waltham, Mass.

Jones & Laughlin Steel Corp.—**W. R. Roesch,** appointed asst. to the vice president, engineering and plant.

Sharon Tube Co.—**J. J. Friedman,** elected chairman of the board; **R. W. Brown,** elected president; **I. M. Yanowitz,** elected vice president and treasurer, and **C. A. Spencer,** elected secretary and comptroller.

National Twist Drill and Tool Co.—**W. L. Lukens,** elected vice president and assistant to the president.

Eastern Stainless Steel Corp.—**J. M. Curley, Jr.,** elected vice president and assistant to the president.

Aluminium Limited Sales, Inc.—**R. E. Young,** named a vice president.

Firth Sterling Inc., Steel Div.—**R. K. Warren,** becomes vice president, sales.

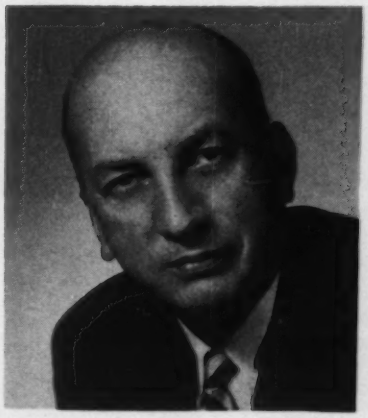
Kennecott Copper Corp.—**C. H. Burgess,** elected vice president, exploration; **R. H. Lounsbury,** appointed general counsel.

Douglas Tool Co.—**J. P. Vederko,** appointed vice president and general manager.

The Electric Storage Battery Co.—**D. N. Smith,** becomes vice president, finance; **M. G. Smith,** vice president, Industrial Div.; **C. G. Grimes,** vice president, research; **J. S. Hudson,** vice president, employee relations; **F. J. Port,** vice president, Automotive Div., and **H. J. Ulkloss, Jr.,** asst. treasurer.

Raytheon Co.—**C. F. Adams,** elected chairman of the board; **R. E. Krafve,** elected president.

Aluminum Co. of America—**J. S. Harrison,** elected vice president, personnel and industrial relations.



J. D. Greensward, elected president, Canadian Allis-Chalmers Ltd.

Jones & Laughlin Steel Corp.—**D. W. Ferguson,** appointed general foreman, galvanizing, Pittsburgh Works.

The International Nickel Co., Inc.—**K. A. DeLonge,** appointed manager, direct sales, Primary Nickel Dept.

Link-Belt Co.—**E. L. Mills,** appointed district manager, Huntington, W. Va., and **E. W. Habberstad,** appointed Duluth district manager.

A. O. Smith International S. A.

(Continued on P. 63)

H. M. Schudt, named director, manufacturing, Allis-Chalmers International.

A. J. Malisek, named vice president, procurement, Bridgeport Brass Co., Bridgeport, Conn.

F. J. Cowley, named manager, Indianapolis (Ind.) plant, Bridgeport Brass Co., Bridgeport, Conn.

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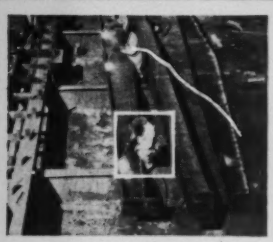

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(Continued from P. 61)

—**J. M. Leinenkugel,** appointed product manager, distributive products.

The Carpenter Steel Co., Alloy Tube Div.—**R. F. Henley,** appointed territorial manager, Cincinnati area; Union, N. J.

M. L. Chase, elected vice president, scrap exports, Luria Bros. & Co., Inc.

Heppenstall Co.—**T. M. Elliott,** appointed superintendent, Pittsburgh plant.

Le Roi Div., Westinghouse Air Brake Co.—**H. A. Zaruba,** appointed manager, Cleveland plant.

Traylor Engineering and Manufacturing Div., Fuller Co.—**E. B. Greef,** appointed district manager, San Francisco office.

J. T. McCarthy, appointed manager, labor relations, Industrial Relations Dept., Blaw-Knox Co., Pittsburgh.

J. S. Ross, appointed manager, production and material control, Automotive Div., A. O. Smith Corp.

The Standard Tube Co.—**P. J. Selinger,** appointed asst. general sales manager.

Plume & Atwood Mfg. Co.—**O. B. Atkin,** appointed plant superintendent.

General Dynamics Corp., Stromberg-Carlson Div.—**H. V. Harsha,** appointed patent counsel.

A. L. Tucker, Jr., appointed asst. superintendent, No. 2 Blooming Mill, Indiana Harbor Works, The Youngstown Sheet & Tube Co.

Alloy Steel Casting Co.—**L. J. Harwood,** appointed sales manager.

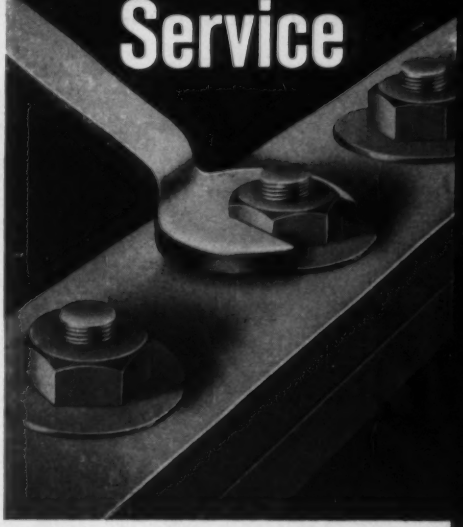
The Colorado Fuel & Iron Co.—**J. B. Moran,** named asst. to the director, traffic.

National Can Corp. — **E. W.**

(Continued on P. 66)

News for
HEAVY INDUSTRY...

Tailored Customer Service



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Start now to take advantage of all these services . . . there's no extra cost to you.

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Indirect Costs: effecting important savings in maintenance, downtime, scrap reduction, tool costs, etc.

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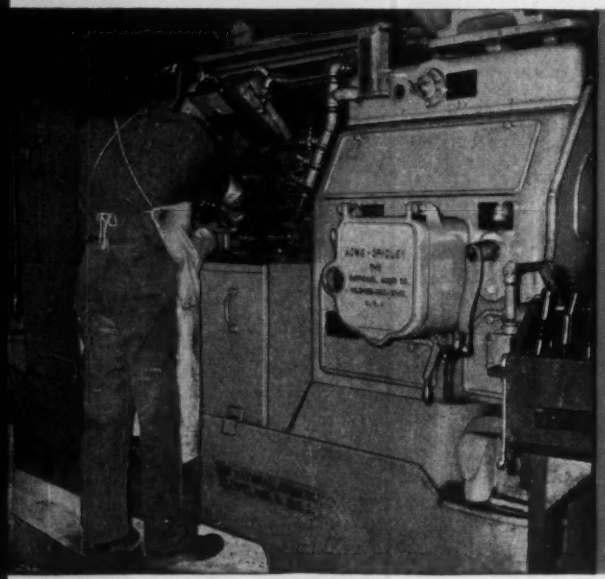
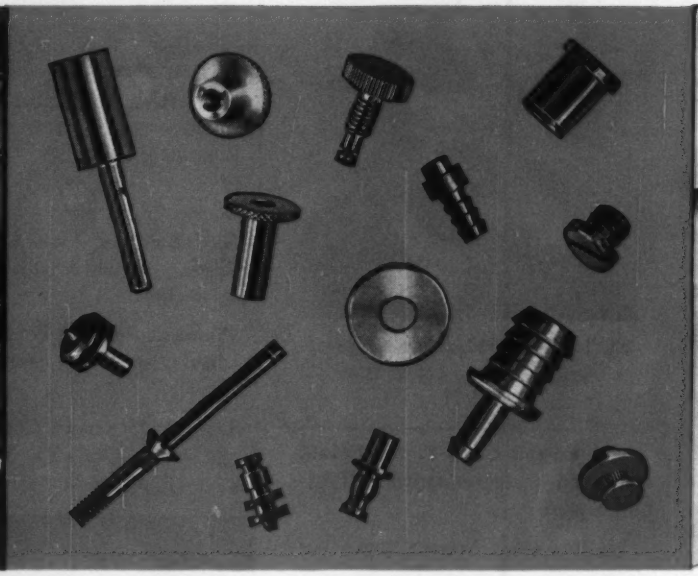
Direct Material Costs: our engineers provide important savings in this area by constantly matching machines and tools to modern metallurgical problems.

Make-or-Buy Reviews: in many cases our Contract Division can assume your production headaches and relieve you of immediate capital investment.

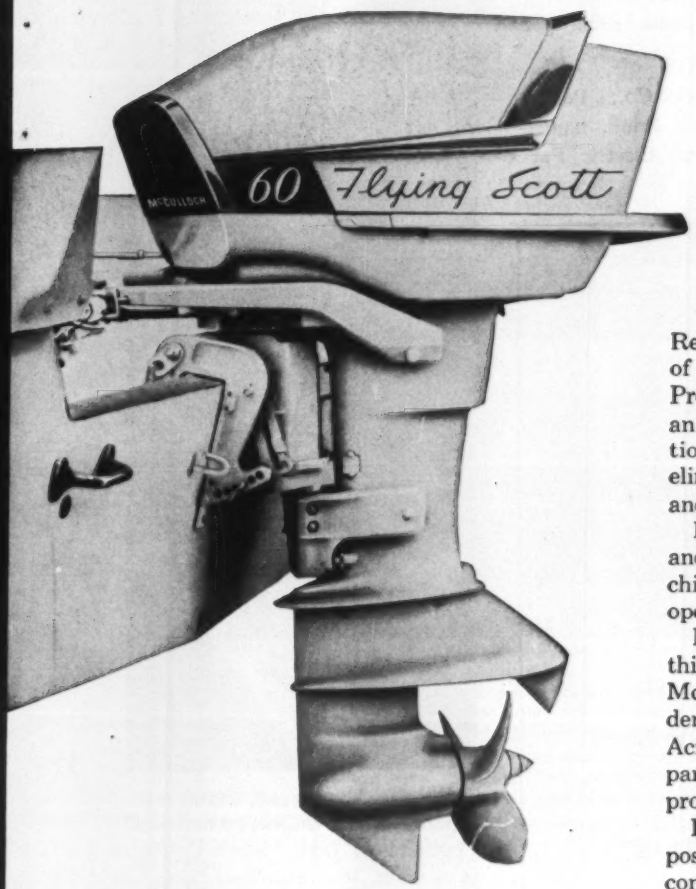
Spot Modernization: pioneering in modern tooling methods, and the flexibility of Acme-Gridleys can provide many "on-the-spot" savings.





McCULLOCH CORPORATION LOGS 66% COST REDUCTION

. . . with Acme-Gridleys



Reduced cost-per-piece of tilt-lock knobs was but one of the enviable savings made possible for the Marine Products Division of the McCulloch Corporation by an Acme-Gridley RA-6 Spindle Automatic. In addition, McCulloch boosted output 200%, practically eliminated scrap losses, and greatly improved finish and final appearance of this small but critical part.

Previous production methods required one primary and two secondary operations. Now, complete machining—including deburring, is done in one automatic operation on the Acme-Gridley.

Dramatic savings in the production of parts like this make Acme-Gridleys a vital, cost-saving cog in McCulloch's highly efficient production set-up. Evidence of this leading manufacturer's high regard for Acme-Gridley efficiency is the fact that 14 different parts for their popular 60HP "Flying Scott" are produced on the rugged, versatile RA-6 Automatic.

It will pay you to thoroughly study the savings possible with Acme-Gridleys. Call, write or wire for complete details on industry's most modern approach to tangible cost reduction.

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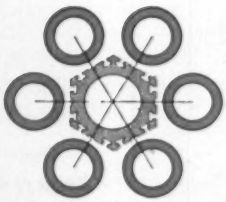

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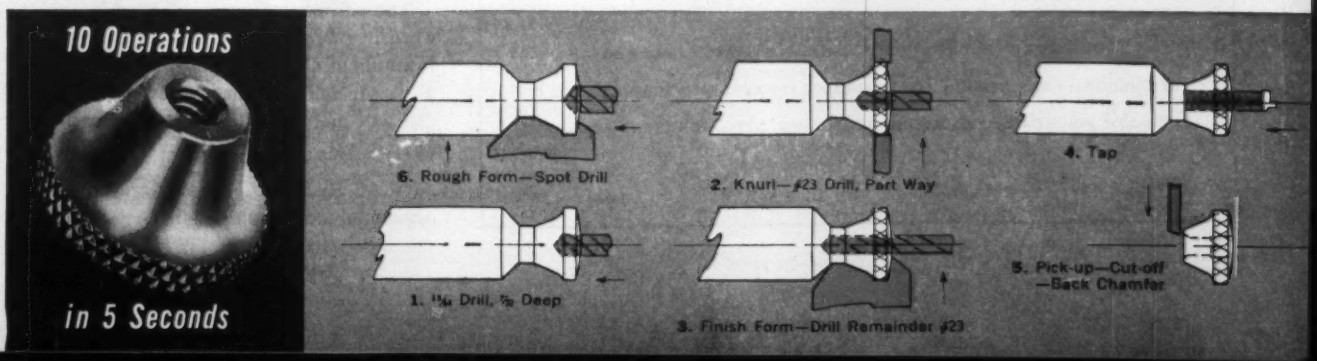

(Continued from P. 63)

Kreatschman, named manager, new Hanover, Pa., plant; **L. W. Gellner,** becomes plant controller, office and production scheduling; **S. R. Hiner, Jr.,** named supervisor, shipping.

Behr-Manning Co., Coated Abrasive Div.—**W. J. Bennett,** appointed field sales manager.

United Shoe Machinery Corp., "POP" Rivet Div.—**H. M. Heitman,** appointed sales engineer, North Atlantic territory.

International Business Machines Corp.—**R. R. Chase,** appointed director, office administration, New York headquarters.

Bridgeport Brass Co.—**N. W. Mitchell,** named consultant, corrosion problems, heat exchanger field.

Bethlehem Steel Co., Pacific Coast Div.—**G. M. Prioli,** named asst. superintendent, Electric Furnace Dept.

We take pleasure in announcing that

H. W. CHRISTENSEN

FORMER CHIEF PURCHASING EXECUTIVE
UNITED STATES STEEL CORPORATION, COLUMBIA GENEVA DIVISION

1959 Recipient J. SHIPMAN GOLD MEDAL AWARD

FORMER PRESIDENT, N. A. P. A.

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W. R. Smart, appointed marketing manager, Distribution Transformer Dept., Pittsfield, Mass., General Electric Co.

W. N. Moore, appointed asst. superintendent, Inspection and Steel Conditioning Dept., South Chicago steel plant, Republic Steel Corp.

Wolverine Tube, Div. of Calumet & Hecla, Inc.—**R. H. Tucker,** appointed sales representative.

Arcair Co.—**H. L. Martin,** appointed field representative, Central United States.

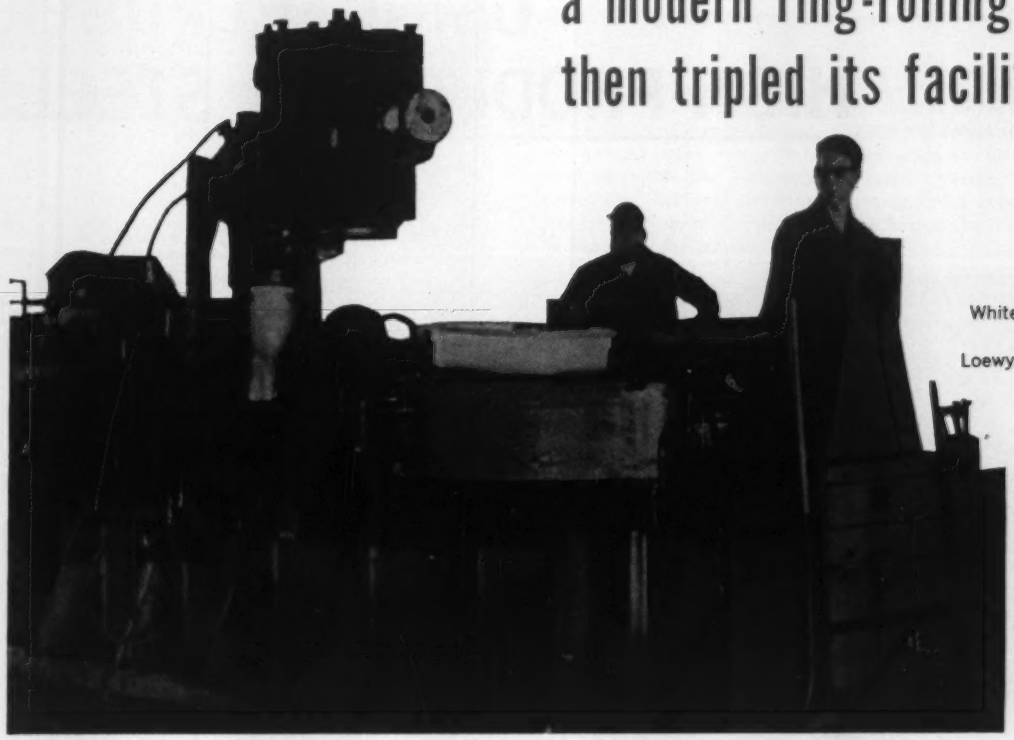
Alan Wood Steel Co.—**R. E. Bergey,** named sales representative, foundry coke and pig iron.

The Eimco Corp. — **Ted Edwards,** named manager, Mining Equipment Div., New York district; **T. J. McNeil,** appointed New York district manager, Eimco Tractor Div.

A. M. Byers Co.—**J. F. Garland,** appointed corrosion engineer.

One good "turn-key" deserves another...

Loewy built and equipped a modern ring-rolling plant, then tripled its facilities



White-hot jet engine ring on a Loewy ring-rolling mill

When the Navy needed rings to a number of unusual specifications for jet planes, a major supplier called upon Loewy-Hydropress to design and build a complete new ring-rolling plant and initiate production. Loewy developed several metal-forming methods, built the basic machinery, designed, constructed and equipped the plant, supplied the complete installation, organized the material flow, and put the plant into operation. Demand for the products quickly exceeded expectations and Loewy was commissioned the following year to triple the size and facilities.

In carrying out what amounted to two "turn-key" jobs, Loewy faced a number of challenging tasks. Navy specifications called for profile rings of alloy steels, stainless steels and titanium up to 72 in. in diameter and 9 in. high. Extruded bar stock and centrifugal castings were to be the basic materials. With these requirements as the goal, Loewy went to work.

Process engineering was confronted with problems not met before, but Loewy metallurgists, together with heat-treating and rolling mill specialists, solved them all, designing the installations to difficult requirements.

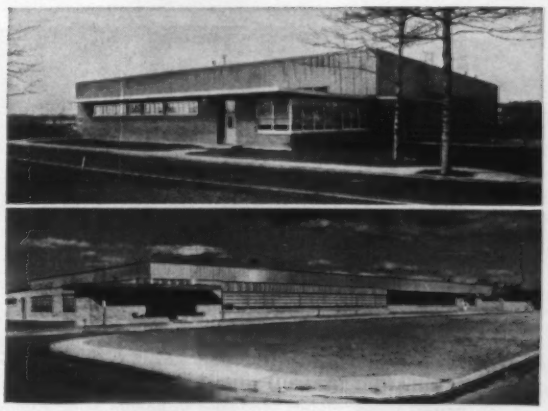
It was also Loewy's task to find the best location for the plant. The site chosen, despite its advantages, presented certain physical obstacles, such as streams which had to be diverted or channeled underground. While machinery and auxiliaries were being built, the building and equipment foundations, designed by Loewy, were poured, and the structure rose.

Latest type machinery was then installed for bending, resistance welding, blank heating, annealing, heat treating, ring rolling, expanding, shrinking, shotblasting and machining. Intricate ventilation and fire-protection systems were installed. The most modern quality-control and metallurgical equipment were integrated into the system.

All deadlines were met. Both the initial plant and the vastly expanded facilities went into production on schedule.

If the swift march of technological progress and the pressure of competition urge you to make new products by new processes—in any industrial facility, large or small—take into account what Loewy can do for you. Contact Dept. A-5.

The initial ring-rolling plant



The expanded plant

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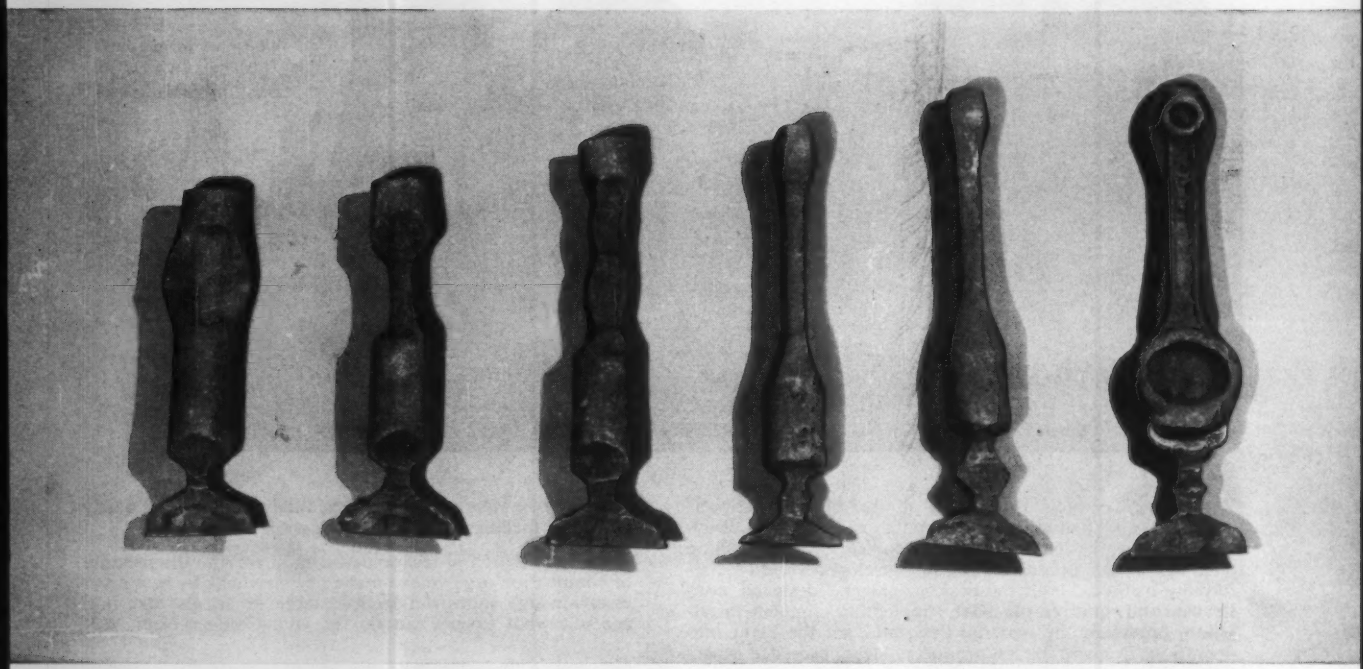
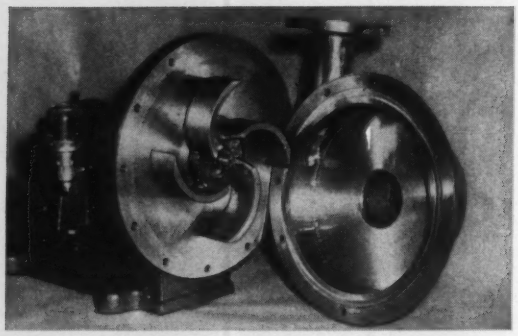
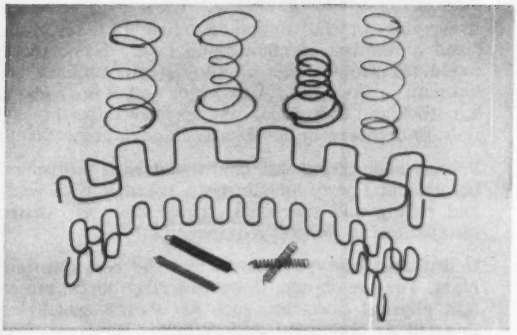




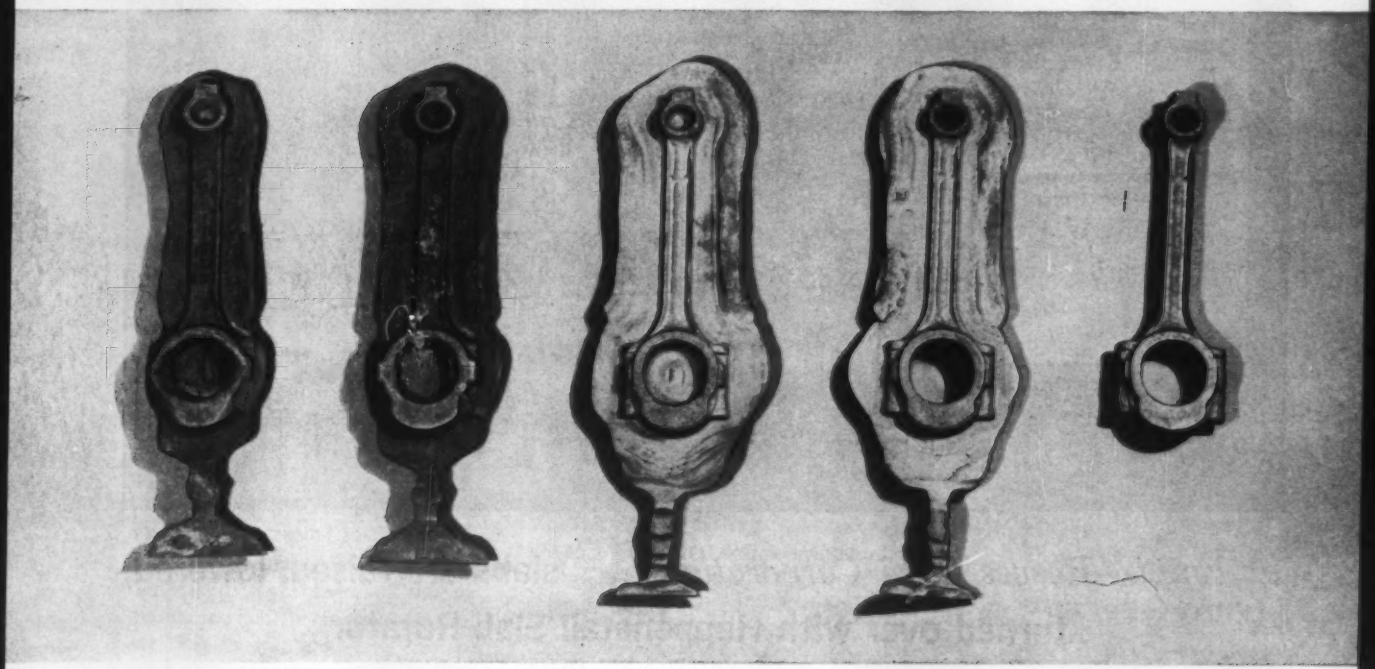
FABRICATING TITANIUM PUMP COMPONENTS: In one of their newest pump models (designed to handle ferric chloride at temperatures of 212°F.), the Mission Manufacturing Company, Houston, Texas, uses Republic Titanium for the casing and impeller. Fabricating operations—shaping, welding in an inert gas atmosphere, and machining—are performed with little change in procedure as compared with other materials. Write for information on Republic Titanium.



MEETING DESIGN REQUIREMENTS: Republic Steel Wire has the necessary strength, ductility, and toughness for difficult forming operations. Republic produces many types for virtually any application: Manufacturer's Coarse Wires; Spring Wires (Standard High Carbon and MB High Carbon); Screw, Rivet, and Heading Wires. Mail coupon for details.

CUTTING GRADER BLADE COSTS: Shunk Manufacturing Company, Bucyrus, Ohio, uses Republic High Carbon Hot Rolled Special Section Bars for their grader blades. Formed to the predominating blade cross section, these special sections eliminate most machining and forming operations. Republic Special Section Bars are available in a wide range of sizes and contours. Write for information.

FORGING CONNECTING RODS: Herbrand Division of the Bingham-Herbrand Corporation, Fremont, Ohio, realizes substantial economies through the use of Republic A-8637 Hot Rolled Alloy Steel. Non-varying uniformity permits faster production with fewer rejects. They start with 2⅛" bars which ultimately undergo 11 forging operations, followed by heat treatment which produces the mechanical properties designed into the forging. Send for details on Republic Alloy Steels.



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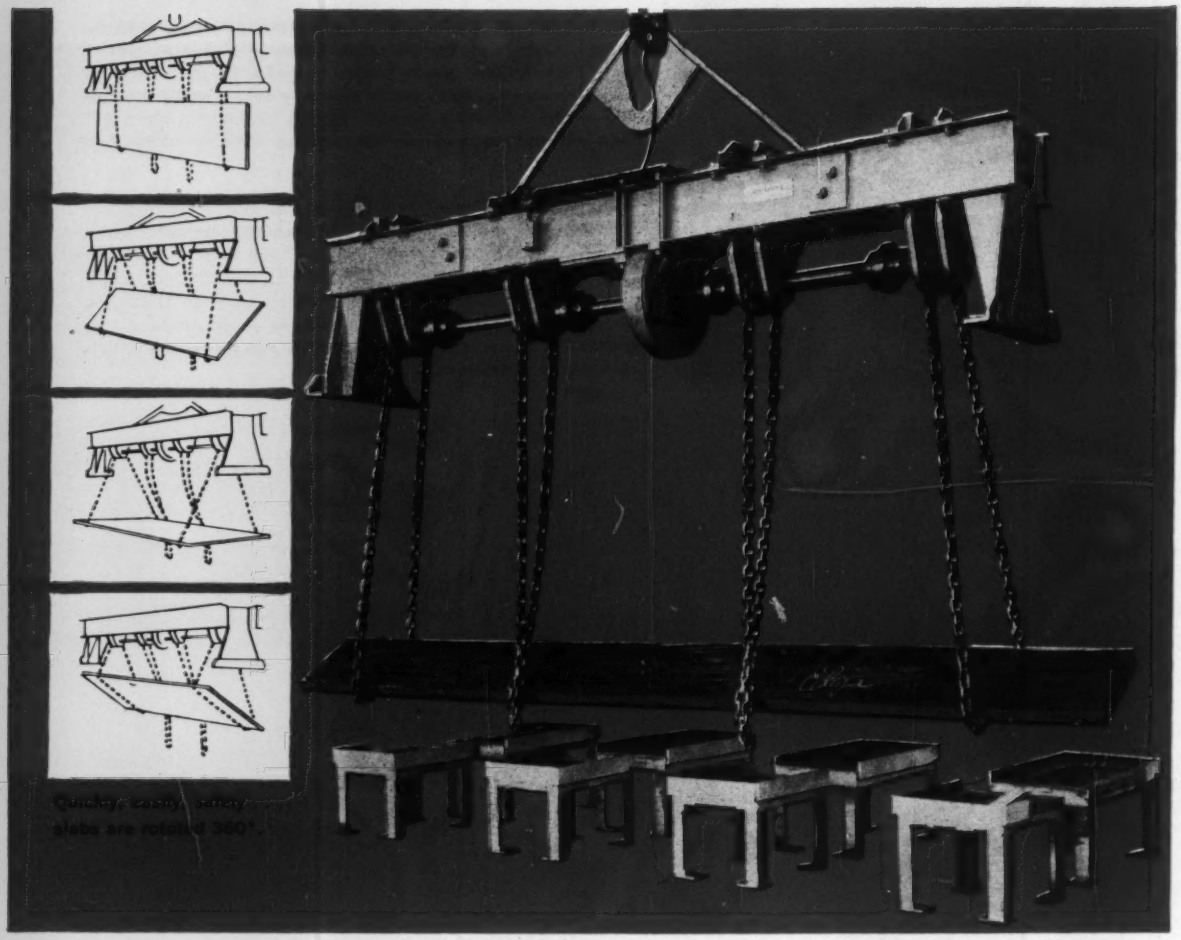

at Empire-Reeves Steel Corporation . . . **slabs are raised, lowered, turned over with Heppenstall Slab Rotator**

Surface grinding of stainless steel slabs has been made easier and faster by this Heppenstall Slab Rotator. Raising, lowering and turning of the slabs is controlled entirely by the crane operator from his cab. Rated at 25,000 pounds capacity, the Rotator handles slabs up to 50-inches wide.

For machine grinding imperfections, the slab is lowered until it rests flat on a series of tables. Then the chains are removed, and the Rotator moved away. After one side is completed, the Rotator is used to turn the other side up. To grind the edges, the slab is turned on edge and lowered between the two rows of tables. When not in use, the Rotator rests on the "legs" built on each end for that purpose.

Slabs less than 14-feet long are handled by the two center chains. The two outer chains are used to handle longer slabs.

After grinding, the slab is carried to the strip mill, lowered on to a conveyor and the chains removed. The Rotator then picks up another slab in the slab mill.

If you'd like more information about this special slab-handling Rotator . . . other Heppenstall slab-handling devices . . . or any other kind of material handling equipment . . . just let us know. If you'd like a quotation, just phone or mail us the details of the job. Heppenstall Company, Materials Handling Division, New Brighton, Pa.

SEE OUR CATALOG IN SWEET'S PLANT ENGINEERING FILE OR WRITE FOR COPY

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Beryllium-Copper Dies Solve Hot-Forming Problem

By J. Mainhardt—Mfgr. Research & Processes, Republic Aviation Corp., Farmingdale, N. Y.

Forming of titanium calls for a die material that can withstand high temperature effects. It also helps if the material is non-galling, castable, weldable, and low-cost.

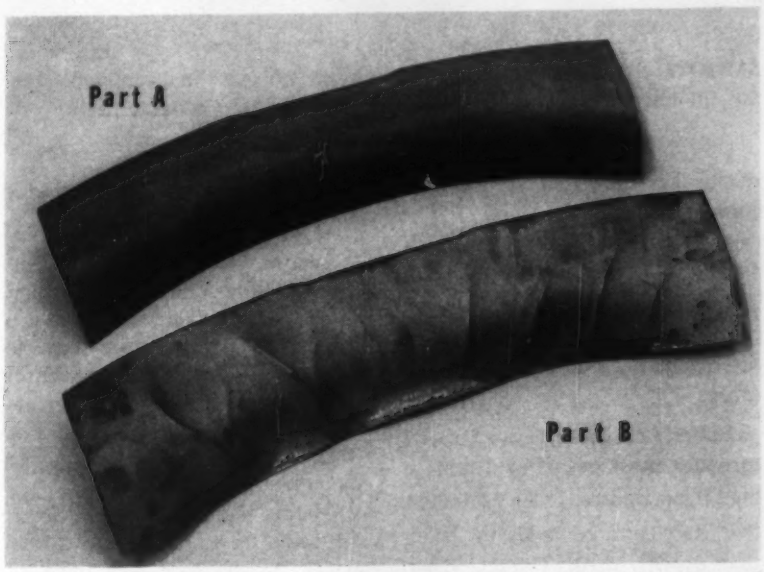
Recent research proves that a beryllium-copper alloy meets all criteria.

■ Tooling for the forming of high strength materials is an ever-growing concern to the aircraft maker. As forming temperatures go up, so do problems of galling, oxidation, and strength needs. And as the hot strength of tool materials increases, so do manufacturing costs.

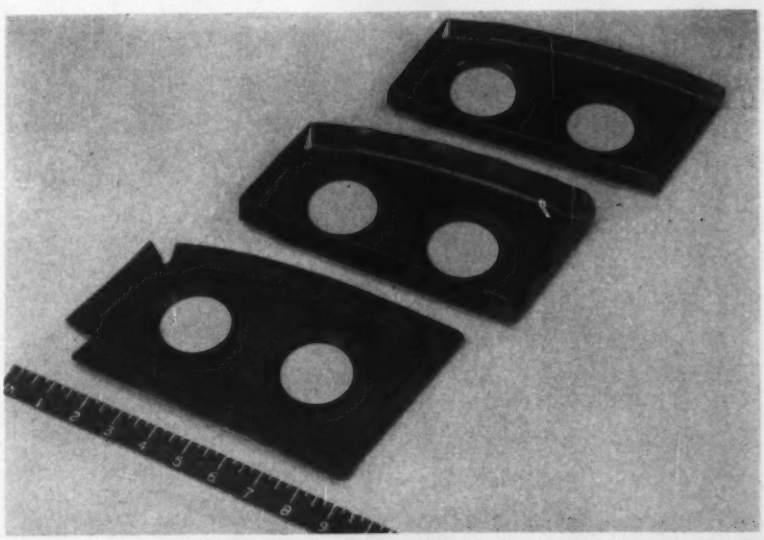
At first glance, beryllium-copper appears to meet most of the demands for a high temperature tooling material. It has good strength and resists corrosion. Also, the alloy can be readily cast to desired shape and contains non-galling characteristics. Its high rate of thermal conductivity is another advantage.

Form Titanium—A study into the use of this alloy for die material was recently completed by Republic Aviation Corp. What is the outcome? Today, titanium parts for high-speed aircraft are being hot-formed—to close tolerances—at the Farmingdale, L. I. site. And the die is made of beryllium-copper.

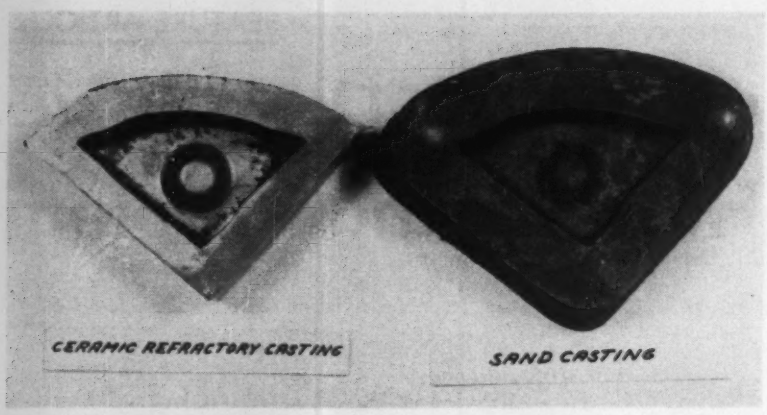
This is no overnight success story. It took several years of development. Questions to be answered included: What alloy should be used for the die? What casting methods are best? How should the



TWO TECHNIQUES: Forming of titanium leading-edge skin of speed brake door calls for high temperatures. Part A was formed with a beryllium-copper die at 1000°F. A drop hammer formed B at room temperature.



IN ONE STEP: Note wrinkles and lack of definition in titanium alloy part —formed at room temperature—in center of photo. Alloy part on top is formed in one step using beryllium-copper dies at 1000°F.



SMOOTH SURFACE: Beryllium-copper die (left), cast in ceramic material, has smooth (70 rms) surface. Note roughness of sand-cast die (right).

die be heated? What are the best forming techniques?

Several alloys were considered for the job. Of these, Berylco #10 and Berylco #20 seemed promising because of their high temperature properties and corrosion resistance.

But any die material, used in hot forming, must resist oxidation at high temperatures. Later tests show that Berylco #20 holds up better than Berylco #10. The major part of this study deals with the former alloy.

Cast to Tolerance—How are the dies cast from this alloy? A review of several techniques shows that a ceramic refractory process seems to be best. It can produce tolerances consistent with airframe part requirements, for example $\pm 1/32$ in. This has been maintained on dies as large as 28 x 28 in.

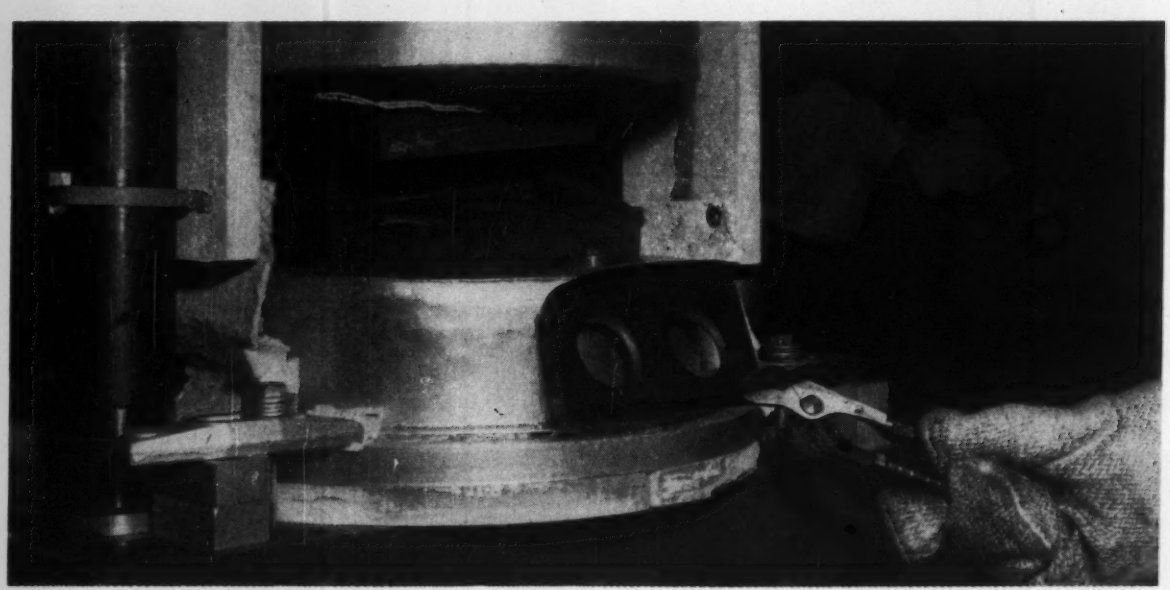
Mating surfaces fit even closer. In some cases, they are within 0.001 in. and a surface finish of 70 rms is common. It takes only a little hand sanding to remove surface roughness.

Need to be Heated—What about heating of the die? Electrical elements seem to be most practical for heating forming dies. They are easy to install; costs are competitive. Electrical heating is clean and does little harm to the tool. Temperature control is excellent; control equipment is flexible.

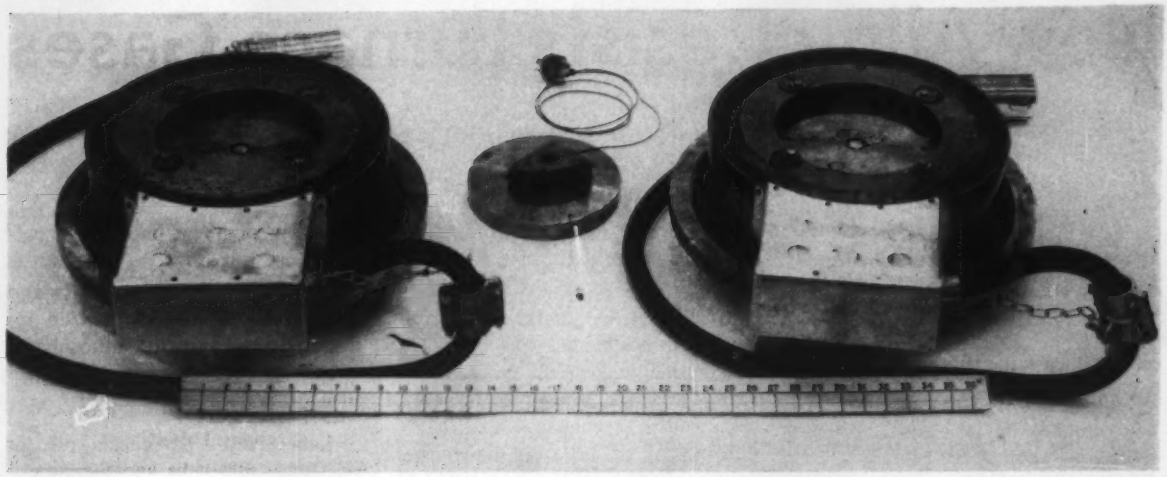
For large awkward dies, integral electrical heating does a good job. It calls for inserting tubular elements into the dies. Examples of where this method is used are in the heated brake dies and in the speed brake door leading edge die.

Hydropress forming operations for magnesium use an electrical heated platen as a heat source. The platen, warmed by 1000 watt strip heaters, keeps form blocks at temperatures up to 700°F. However, in production, form blocks are first preheated in the furnace to save seat-up time.

Any Other Methods? — What about steam and oil heating? These methods may be economical.



FORMS AT 1000°F: Electrically heated universal die holders are used for heating beryllium-copper dies to titanium alloy forming-temperature. Power supply and temperature are controlled automatically.



ALLOW QUICK CHANGING: Universal die holders permit rapid interchange of beryllium-copper dies.

Tests were made using a steam-heating chamber within a thin-walled die. Ideal forming temperatures were not obtained in this instance. But the test shows that steam does not harm the die material. And the temperature achieved was uniform over the entire die.

Oil at 700°F in a circulating heater gives a die surface temperature of 510°-530°F. The heat-up time is about 30 minutes.

After 20 hours, the oil shows no signs of pick-up of die material or loss of properties. But there is one major drawback. Equipment is bulky and awkward. When this problem is solved, oil heat can be used for moderate forming temperatures.

Preheated Tools—What are the best forming techniques? High temperature brake forming has always been awkward. It usually means preheating the blanks, then forming with tools that are either preheated or at room temperature. In both cases, temperature control is doubtful.

Three years ago, a 100 in. beryllium-copper die was designed for making a large number of brake-formed titanium shapes. The tool consists of removable male and female dies, and die holders. Heating is by insert-type cartridge units.

Forming magnesium alloy at 350°-360°F is no problem; there is no surface damage to part or die. Forming aluminum alloys at 700°-900°F is another matter; the aluminum galls and adheres to the die surface. In time, this causes jamming of the tool.

Alter the Dies—To continue with the tests, the brake dies were modified in two ways. First, they were cut down in length to 90 in. This is to provide more space for wiring the heaters and to eliminate the unheated length of the dies—thus reducing warpage.

Second, additional insulation was placed under the dies in order to eliminate warpage of brake ram.

Need Protection—As noted before, aluminum alloys gall and adhere to the die. To find the answer, a study was made of the effect of platings on the die surface.

Chromium platings held up well after testing at 850°F. Therefore, despite some discoloration of the chrome plate, its low cost makes it most practical for a protective coating for beryllium-copper dies.

After making these changes, tests were resumed—with success—on forming of both aluminum and titanium alloys. Thicknesses went up to 0.090 in. on 2014-0 aluminum alloy and 0.064 in. on AMS 4908 titanium alloy.

No Bending Cracks—Using hot die lubricant, various bend angles from 45-150 tight vee shapes were made. There was no surface damage to parts or pitting of die surface. Sectioned specimens show no cracks.

Beryllium-copper dies having thin walls also prove out. Take the case of forming an 11 x 18 in. AZ31 magnesium panel, 0.032 in. thick. The method uses a heated platen to maintain die temperature.

The weight of a solid beryllium-copper press block would have been excessive. To lighten the die for handling and to reduce the cost of the tool, a thin-walled die was made.

Takes Single Pressing—Results: The "as-cast" working surface is usable. Finish is about 63 micro-inches. And a single pressing is enough to produce a finished part.

For this job, the beryllium-copper die has certain advantages over the standard kirksite sand-cast die. These include less weight, easier preparation and loading, and less heat-up time. Moreover, it takes only a single pressing with the beryllium-copper die as against two pressings with the standard die.

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New Alloy Resists Furnace Gases

By F. S. Sibley—Project Engineer, Hoskins Mfg. Co., Detroit

Materials, exposed to heat-treat atmospheres, must stave off corrosion, carburization and "green rot."

Lab and field tests reveal that an improved nickel-chromium alloy can do the job.

▪ Atmospheres in electric heat treating furnaces are fine—so far as finished quality of work is concerned. But many of the gaseous mixtures involved impose very stringent demands on the materials used in the furnace—particularly the heating elements.

Heating elements alloys can give good service in atmospheres. To obtain long life, however, all factors which add to adverse conditions during operation must be properly controlled.

Harmful Gases Form—With reducing atmospheres, for example, all contaminants should be removed from the work as well as the furnace before starting up. This is to cut out or at least minimize the forming of harmful gases.

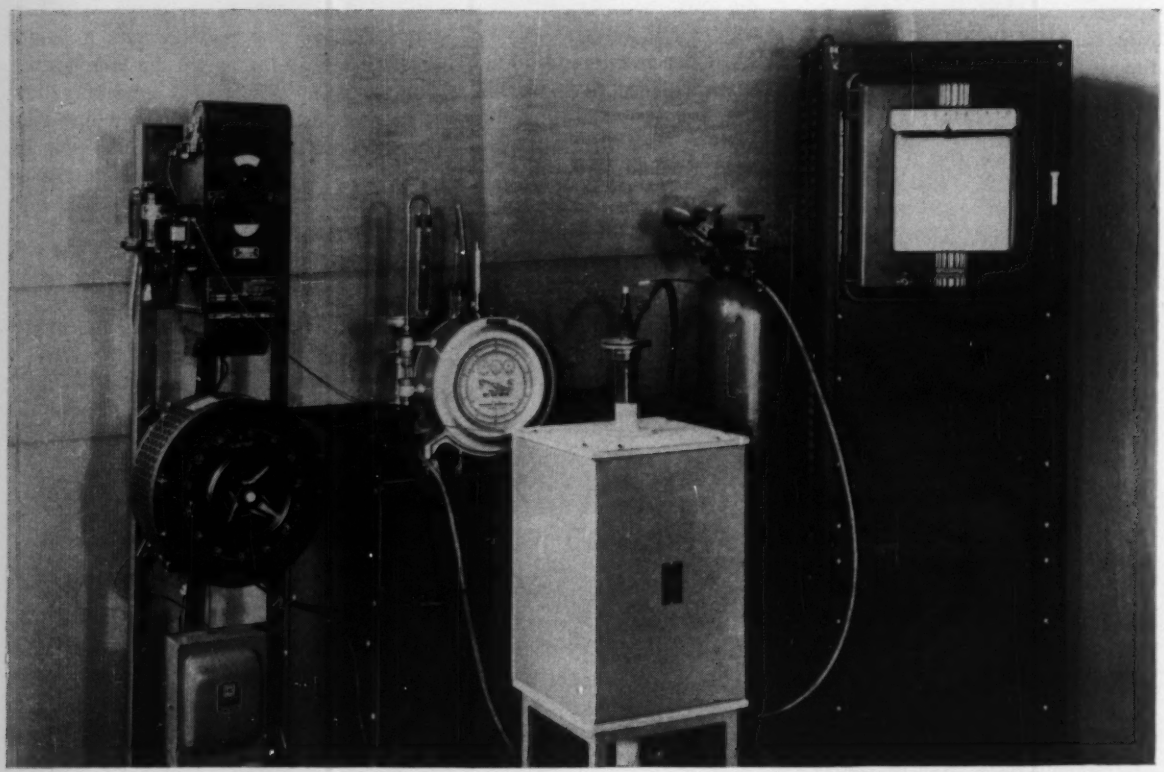
With carburizing atmospheres, keep carbon potentials at the lowest possible level required for the work. Take special care to avoid overheating—even for short periods of time.

Because of the need for these precautions, as well as the growing use of atmospheres in heat treating, Hoskings Mfg. Co., Detroit, has worked for the past 5 years on the development of an improved, heating-element alloy.

Such an alloy must withstand the adverse conditions met in reducing and carburizing atmospheres —and at chamber temperatures up to 2150°F.

Lab Setup—To check present resistance materials and the experimental alloys, a tube furnace was equipped with a high-temperature test chamber. This unit exposes several strips of alloys to various atmospheres under closely controlled conditions.

To check the effects of these atmospheres over a wide range of temperatures, the furnace heating elements were wound to produce a thermal gradient ranging from 1000°F at both ends of the test



EXPOSE TO GAS: Test calls for exposing experimental alloys to various gases in hot tube furnace.

chamber to 2200°F at the center.

Tests are Severe — Atmospheres used for all tests were brought to specification and controlled in use to simulate the most severe conditions likely to be met in commercial heat treating.

In testing each group of alloys, the flow of gas was started before the furnace was turned on. It was then kept at a steady rate during warmup to 2200°F and throughout test periods. These periods lasted from 2-84 hours.

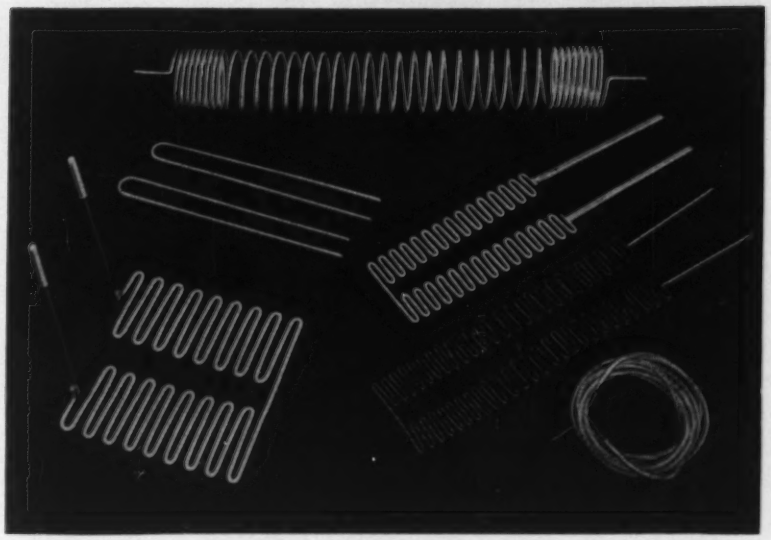
Power was then turned off and the atmosphere changed to argon for about 1 hour while the furnace cooled to ambient temperature.

Meets the Criteria—What are the results of this 5 year program? It reveals that only one of some 200 experimental alloy compositions is superior in all respects to the standard resistance alloys. The new composition, named Chromel-AA, is a modified 80-20 nickel-chromium alloy. It is made unique by adding critical amounts of iron, silicon, cobalt, manganese, and columbium. Its specific resistance is 700 ohms per circular mil foot at 68°F.

Chromel-AA shows excellent resistance to carbon pickup at all temperatures. Also, it has improved corrosion resistance in high temperature reducing atmospheres. The problem of attack by sulfur, chlorine and other harmful contaminants often present, intentionally or accidentally, in controlled atmospheres is reduced.

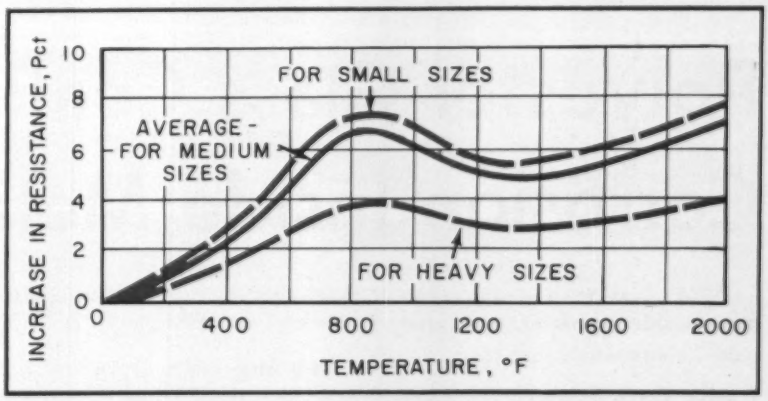
Moreover, the new alloy does not suffer from "green rot"—an intergranular chromium oxidation which often affects heating-element alloys in the critical range from 1500°-1800°F.

Holds Up in Field—How does Chromel-AA perform under actual service conditions? Consider these sample case histories. Used in ladle covers for aluminum holding furnaces, its resistance to chlorine-bearing atmosphere at 1725°-1800°F resulted in 3-5 times the life of previous alloys.



RESIST ATTACK: Heating elements, made of a modified 80 nickel-20 chromium alloy, display long life despite exposure to severe furnace gases.

How Heating Affects Resistance



SIZE IS FACTOR: Temperature-resistance curves show the percent increase in the resistance of various size Chromel-AA wires after heating.

Exposed to a carburizing atmosphere with very high carbon potentials, heating elements made of Chromel-AA were working satisfactorily after 5 months of use. The material used before generally failed due to carbon pick-up within a matter of weeks.

In another field test, where the controlled atmosphere was known to cause "green rot," Chromel-AA heating elements were still in use and showed no sign of deterioration after 4 months of service.

Other Uses—The new resistance alloy has other points in its favor. It is strong, ductile, and stable. Hence, it can be used for a number of high-temperature mechanical-purpose jobs. Examples include conveyor belts and heat treating trays and fixtures, as well as corrosion and oxidation resistant screens, filters and strainers.

In view of the results obtained from many lab and field tests, Chromel-AA has now been released for general commercial use in all controlled atmosphere furnaces operating up to 2150°F.

PRIMER COAT: To prevent the metal from oxidizing, a primer coat of resin is applied to the newly-cleaned metal surface. This polyester provides adequate adhesion and is very easy to apply.

Polyester-Glass Coating Resists Corrosion Inside Metal Tank

Store highly-corrosive solutions inside a metal tank and your linings won't last long.

Give these linings a thorough coating of polyester resin and they'll stand up to the task.

■ The storage of highly-corrosive solutions requires a tank lining of top quality. And glass-reinforced polyester resin is well suited for such a purpose.

Foote Mineral Co. has a tank at its Knoxville, Tenn. plant for storing anolyte solutions. Rather than use an epoxy undercoat, the company decided to try polyester resin. This resin does have epoxy-like traits. It's also lower in cost and easier to apply.

The resin used to line the tank was a Bisphenol A polyester, called Atlac 382, a product of Atlas Powder Co., Wilmington, Del.

First Step—After the metal surface had been thoroughly sand-blasted, a coat of resin was applied as a primer. The next coat was the polyester resin. This was used to bond a combination of glass cloth and 1½-oz glass mat to the tank surface. The resin can be applied either by spray gun or brush.

The glass bonding resin coat is applied to one section of the wall at a time. Each section runs the length of the wall and is just the width of the glass cloth and mat. Before the resin has time to set, the glass section is hung from the top of the wall, then smoothed against the tacky surface.

Slow Cure—Only a minimum of accelerator is used in the resin compound. This retards the curing rate. No attempt is made at this time to disperse the bubbles underneath the cloth. In the next step, the cloth is saturated with resin, and the major air bubbles are worked out with rollers.

As soon as the whole strip of cloth is in place, it's given a resin coating and final smoothing. This insures a thorough resin coat on the cloth surface. It also bonds the surface firmly against the tank, eliminating all air bubbles.

Systematic Approach — Coating and smoothing is done in sections down the tank wall. Each section runs about 3 ft down the wall and is the width of the glass cloth.

It's vital that the entire cloth area be saturated with resin. Cor-

CLEAN SURFACE: First step in the operation is to sand blast the entire surface. This readies the surface for the resin coating. Dirt or film interferes with the effectiveness of the coating.

rosion can attack through the dry glass in the event that some area has not been thoroughly saturated. If the cloth is not firmly bonded to the tank, temperature changes are apt to start the cloth cracking away from the tank surface, thereby causing a weak spot.

Solid Coating—The primer coat is too thin to give adequate protection. A pinhole-size defect can cause complete failure of the tank. The final step involves smoothing the cloth and lapping it to the bottom of the tank.

When the resin coat has cured, the inside of the tank is inspected inch-by-inch with a high-tension probe. Any hole in the resin will cause an electric arc to jump from the probe to the tank wall.

Perfect Job — Then, after the inspection tour, added resin and glass are applied to correct the defect. At Foote Mineral, not one defect was found in the coating.

Most of the corrosion protection comes from the resin itself and not from the glass cloth. The glass serves as a structural unit to cover up any defects in the metal.

GLASS CLOTH: Resin coat for bonding the glass cloth to the surface is applied over the primer coat, then smoothed against the tacky resin.

Numerically-Controlled Milling: Faster and More Accurate

By Jesse Daugherty—Vice Pres.-Engrg., Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.

Industry is starting to reap greater benefits from the union of computer and numerical control equipment.

So get ready for this new and exciting phase in metalworking techniques.

■ Industry is thinking more and more in terms of improved rates of production. The secret of these fast rates is, of course, automation. Behind the scenes, a revolution is taking place. It is numerical controls.

Big strides are being made daily in numerically-controlled equipment. Take the case of an order for 2200 templates from an aircraft company. These templates varied from one another in size and shape. And they covered more than 25,000 ft. Yet, modern numerical controls shipped the finished order within 90 working days.

Imagine how long it would have taken to ship this order using conventional machining methods. Advanced computer programming and program checking were done in an average of seven minutes per template.

What It Means—At Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., the value of this system is appreciated. This company knows that floor-to-floor time can be reduced by as much as 75 pct. And it also knows what numerical controls can do to tighten tolerances, to increase product uniformity and to improve scheduling and pricing.

From MIT, Giddings & Lewis learned the importance of data processing. This led to a close tie between the machine tool builder and the International Business Machines Corp., White Plains, N. Y. The two companies settled on a general purpose computer to handle programming and instruction input. And IBM's Type 650 electronic data processing system seemed to fill the bill.

A Step Forward—The unit offers both accuracy and speed. And it's an integral part of Giddings & Lewis's planer-type milling machine. This setup is used for demonstrations as well as subcontract milling.

One of the parts produced by this machine is a closure for the second-stage combustion chamber of a solid-propellant missile. Complete programs for this part were written within 12 hr upon receipt of the project. This 12-hr period also takes care of processing the data through the system, converting it to tape and producing the part in one continuous piece.

The Secret—Much of the success at Giddings & Lewis can be traced to the company's new Model B Numericord Director. This machine can record its magnetic-tape end product at four times actual machining time. That makes it possible for the director to supply four Numeripath machines with magnetic tape.

Previous directors using the ½-second command method recorded magnetic tape at one-fourth the speed of the machine tool. Thus, the new director is 16 times faster than the former setup.

The director allows for a cutting

FIRST OF ITS KIND: The world's first tape-controlled mill for vertical boring and turning is a big advance in metalworking.

tool feed speed of 120 ipm. This vital part also has a photoelectric pickup in the punched tape reading unit, thereby increasing "read-in" speeds. Magnetic core units are now contained in individual "plug-in" modules, making routine maintenance quite easy. Also, the tape recording unit has been transistorized.

Many Jobs—What other work is the numerically-controlled machine doing? It's making parts for Giddings & Lewis's own equipment with numerical control machines. These are regular production parts that make up many of the point-to-point positioning tools. Forging dies are being produced, too.

The setup is also handling twisted airfoil shapes found in missile skins and three-dimensional propeller blades. Impossible without tape controls.

Helpful Function—The big item in the company's program is service to those who own numerical control equipment but are not set up for data processing. Data are received in the form of blueprints, statistics or punched tape. Giddings & Lewis then supplies the finished parts or magnetic tape.

The company is geared to develop programs in which tools go from "stand still" to "full speed"—360 ipm—in one command. The tools can also come to a dead stop from full speed in a single command. Other methods of tape control take anywhere from six to twenty commands to perform these same functions.

The system takes over as soon as the blueprint or table is received at the Wisconsin plant. From these data, a programmer develops two blocks of figures. One block accounts for operational steps, feed rates, fixtures and tool configurations. Meanwhile, a path program represents the mathematical path the tool center-line must follow.

Into Code — These details are then coded and run off into punched-card form. Next, the cards are processed through an IBM 407 accounting machine to obtain a printed manuscript. This is compared with the written manuscript. And the IBM 650 computer then converts the code into coordinate data. The same unit also computes the cutter offset.

After the cards are run through the 407 unit to print out a listing of figures, they are checked against the part blueprint for proper shape. The cutter path also is plotted from the cards on an automatic plotter which receives the data from an IBM card-input machine.

Instructions go into Numericord language by placing the cards in a 9207 data translator, a card-to-tape converter. The resultant punched paper tape feeds into the director. Here, it's converted from decimal, numerical data into time-coordinated electrical signals.

START FROM SCRATCH: Working only with the manufacturer's drawings, engineers chart the process needed to shape close-dimensional parts.

FINAL TAPE: Reels of magnetic tape serve as the input for any machine tool with Numeripath control—providing a boost in speeds.

Design of High-Speed Press Breaks with Tradition

Need faster punching speeds to handle light-gage metals and non-metallic materials?

Here's a new high-speed press that punches at better than 1500 strokes per minute.

▪ It's one thing to design a punch press to "break the speed barrier," but it's something else to develop a system to feed the parts at such ultra-high speeds.

Such a press is now in existence. And so is the accompanying feed device. But to do the job, it took new materials in both structural and operating parts.

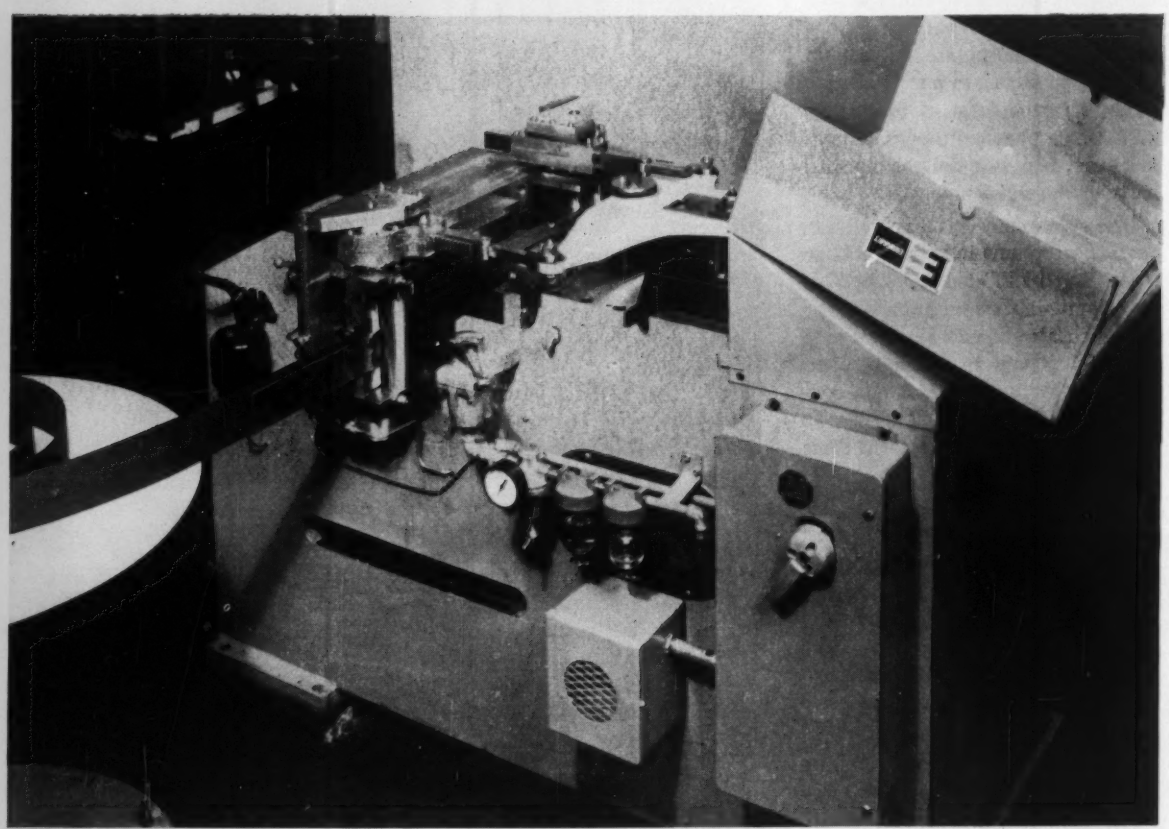
The new compact 25-ton press is a product of Emhart Manufacturing Co.'s Hudson Division, Hudson, N. Y. The press required an unusual arrangement of basic press parts to achieve the design needed for the high speeds at which it will run.

How Fast? — What is the machine's speed? Under limited testing, it has run successfully in excess of 1500 strokes per minute. The word from Hudson is that final speeds will make this press the fastest yet produced in this country.

A die used in normal production at less than 600 strokes per minute was employed in the early tests. And no changes were made to the die.

To conserve floor space, the designers compressed the unit to about the size of an office desk. It measures 40 in. high, 25 in. deep and 54 in. in overall length.

Design Changes—In design, the press differs from conventional "open back inclinable" machines in two ways. First, the press is designed on a horizontal plane. And secondly, the flywheel is centered in the bottom of the press instead of



DESK SIZE: Compact press is about the same size as an office desk. Its low center of gravity provides press stability at high speeds. The ultra-high speed press also contains a specially-designed roll feed.

overhanging at the side.

A major advantage of the horizontal press is that work comes straight out toward the operator in a chute from the bed of the press. In conventional designs, the work is often pushed into an inaccessible area. Then it's brought out in a chute with at least one curve.

Balanced — Why locate the flywheel in the bottom of the press? Hudson engineers will tell you that it creates a balanced design; it distributes the vibrations more evenly.

The horizontal design, along with the new location of the flywheel, adds up to a low center of gravity. This, in turn, means greater press stability — a big factor at high speeds. Of course, this design concept is the feature that makes the unit so compact.

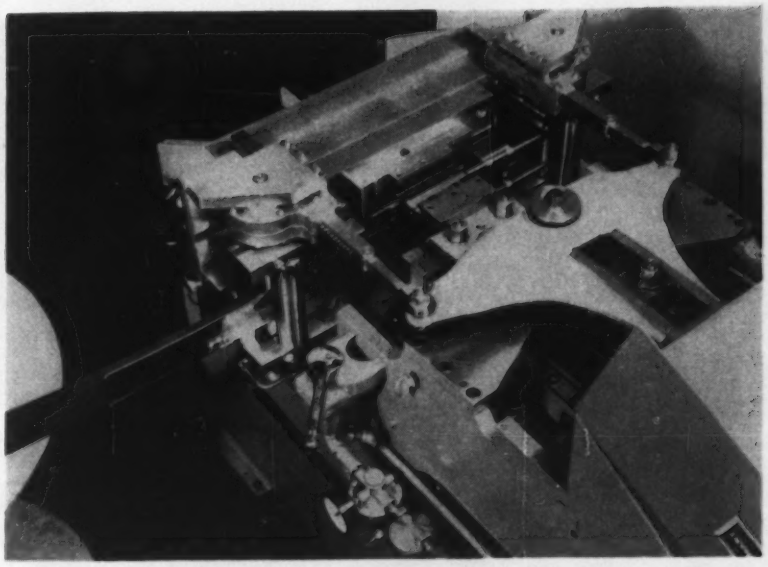
New Approach—But new thinking played a vital role in the press's design. Engineers broke with tradition. They looked beyond cast iron. They wanted some materials to match their designs.

The first break came when they selected magnesium for the slide. And why not. It's one-fourth the weight of cast iron. Another material was needed for the bearing surface of the slideways. A laminated plastic was chosen. The plastic was also selected for brake and clutch material.

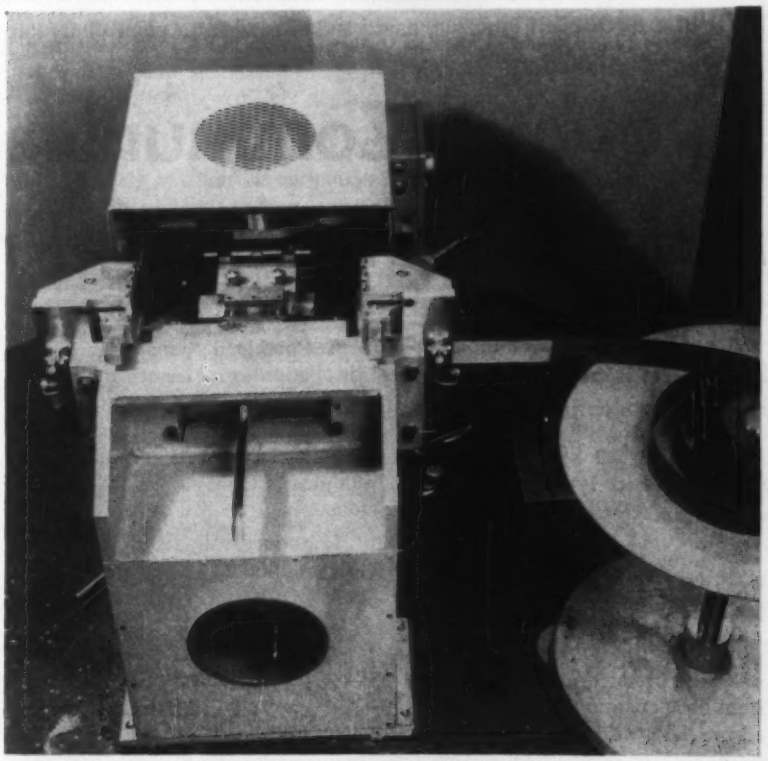
Then came the problem of finding a method to feed the material accurately at high speeds. Nothing was available in existing equipment. It had to be new. So a special feed was developed.

Walking Beam—The result was a double roll feed with a drive of "walking beam" construction. Each feed is rack driven from the walking beam. This, in turn, is driven by a crank mounted at the upper end of the press shaft. The feed can handle work up to 6 in. wide with a 4-in. long feed. Roll releases are air operated.

All in all, it's a rugged, compact press and feed to handle the growing volume of production in light gage metals and non-metallic materials.

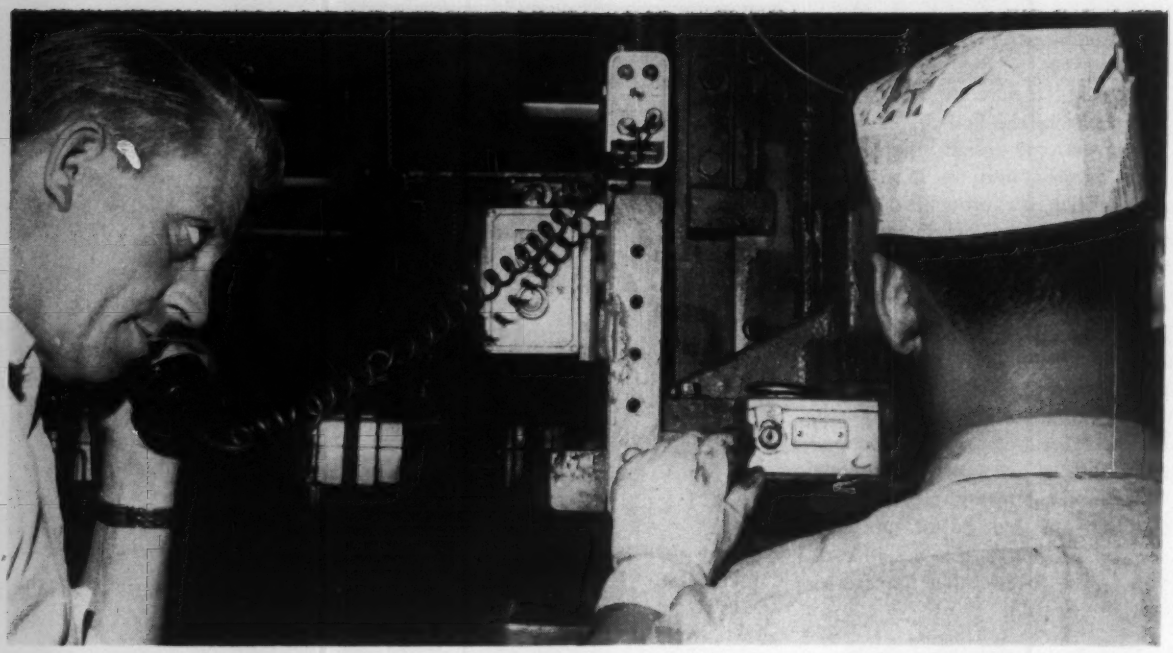


WALKING BEAM: Specially-developed double roll feed is included in the press's walking beam construction—a design innovation.



HIGH FEED RATE: The 25-ton press can feed stock up to 6 in. wide with a 4-in. long feed. Unit is built with a vertical crankshaft.

This is a good example of ways in which American industry can develop a better machine without relying too much on the designs of the past. In many cases, new thinking can only achieve design horizons by making that break with the past. And if the design is well conceived, American industry is thankful. New materials are at your disposal.



TROUBLE STOPPER: Foreman, paged and dispatched to point of trouble, quickly analyzes situation.

Two-Way Communications Setup Monitors Stamping Production

A centralized electro-mechanical system is coping with poor shop communications.

It's showing tangible cost savings for a typical stamping operation.

By R. H. Eshelman,
Machinery Editor

▪ Many production troubles stem from poor communications. Extended breakdowns, parts and materials shortages, tooling bottlenecks, inaccurate inventories and uncertain worker relations often are attributed to this cause.

If shop communications are still in the belt and pulley era, what's the remedy? How can you modernize something so intangible and make it pay?

A Combined System—In a trial installation at its Eight-Mile stamping plant, in Detroit, Chrysler Corp. believes it has found an answer: It's an electro-mechanical recorder coupled with a public address system.

It automatically tabulates production output on a central control board. But equally important is the flexible public address system that gives this central office real control over production.

It catches little troubles before they become big ones. It speeds maintenance and repairs, follows tooling closely. By keeping a finger on the pulse of production, it cuts idle time and downtime sharply.

Major Gains—The system affords the plant three key advantages: allows greater utilization of machines and materials; improves communications between workers on the line and production management; cuts paperwork of foremen 50 pct, freeing them for their real job.

Discussing this system for coordinating supervision and production control, plant manager F. S. Mitchell cites other gains: "With maximum equipment utilization," he notes, "it will eventually result in the highest possible quality control. Production programming will have machine and line output data on which to determine more accurately production performance within the plant and to plot future scheduling."

Centralizes Control — As developed by Hancock Industries, Jackson, Mich., the system—known as Telecontrol—makes use of four basic elements. First of these is a

control box at key points on the production line.

Each box is equipped with a switch that allows the operator to signal the control center; a telephone jack for direct communication with the center; wiring hookup that records every part processed at that station on a counter in the center.

Also on the production floor, each foreman has a portable telephone unit which he carries on a belt clip. He can plug into any of the control boxes to talk directly with the control center.

Tallies Production—In the control center, located on a large panel, are time and piece counters. These tally production from each station. Also show number of parts remaining in the run.

This board identifies each production line and the job by number-code. Productive time, downtime, total pieces made and balance on the job show. Red and green lights reveal production status at any moment.

A public address system gives the control center means for communicating with operators, foremen and maintenance people. Circuits are provided to divide the production floor into seven areas, so only the line or area concerned is addressed.

Detailed Records — The system has added two additional features. One is a stylus-strip-chart recorder with 40 channels. This can be hooked into any of some 220 pieces of production equipment in the plant to analyze repetitive troubles.

It reveals minute-by-minute activity, shows every time a stoppage occurs. With this device it's possible to pinpoint sources of troubles, figure load factors, machine efficiency, etc.

A second aid is a job board. This is a rack in the central control room with slots for production record cards for each job scheduled.

For Each Job—Three major records give needed data for each job. First is a master tool and die card which lists part number and description. It notes line assigned to the job, also the operations and dies needed.

A detail tool and die card shows performance record of each tool or die: part, operation, line, and any troubles encountered by date. Finally a production schedule card lists a chronological shift record of the job, including line number, scrap, good parts, balance to be produced.

These cards, made up from information flowing into the center, give an invaluable tooling and production record. Production control department uses them in scheduling runs, and eliminating production bottlenecks. Manufacturing engineering uses them in maintaining, repairing and improving tooling.

How System Works—The central control room has become the nerve center of the plant. Steady green lights show which lines are operating, with counters clicking off production. A flashing red light signals trouble on a line.

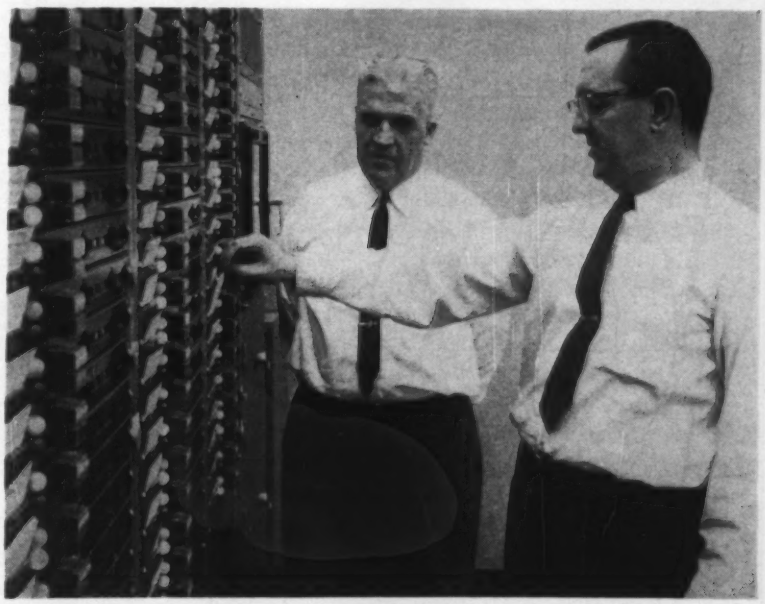
The coordinator pages the foreman, quickly has him on the phone and is dispatching needed stock, maintenance people, or lift truck to remove completed parts. A steady red light shows a line has been shut down by the foreman. The coordinator shifts the people to another ready run, if the shutdown is likely to be lengthy.

The subtract counter on the board shows when each line is nearing completion of the run. When finished a flashing green signal appears. Then the coordinator pages the foreman so he can stop the flow of parts, finish those in process.

Fast Action — In conventional stamping or machining operations the usual pattern is a considerable time lapse between on set of even minor troubles and corrective action. Pile-up of finished parts, stock exhausted, blown fuses, all demand help from outside the department.

Such usual interruptions quickly pile up idle time. With the new plant-wide eyes and ears Chrysler finds they cut this sharply. Now remedial action starts in a matter of three or four minutes of the trouble signal.

There's little waste motion dispatching maintenance people or truck operators. And because much routine paperwork and footwork of foremen is eliminated they're available, both for emergencies and to give more attention to actual supervision and worker relations.



TELLS ALL: Production control coordinator and W. C. Fish, department manager, look over job cards in rack by each line record.

Link Cleaning and Degreasing To Production Machining

Automatic production lines feed metal parts to high-speed cleaning and degreasing units.

This approach eliminates bottlenecks which often prove almost as costly as fabrication.

▪ Separate cleaning and degreasing processes have—until now—hindered production from screw machines, blanking presses and other metalworking machinery. In many cases these follow-up processes prove to be costly bottlenecks. Often their time consumption and costs approach those of actual fabrication.

Both bottleneck operations are combined for the first time in an automated, ultrasonic - processing unit, made by the Metalclean Equipment Co., Bala Cynwyd, Pa.

Quick Cleaning—Called AutoSonex, the machine processes parts as fast as they feed from machine tools or vibratory hoppers. The new unit integrates cleaning and degreasing with high-speed production. It keeps pace with automatic machine tools. And it delivers clean, dry parts.

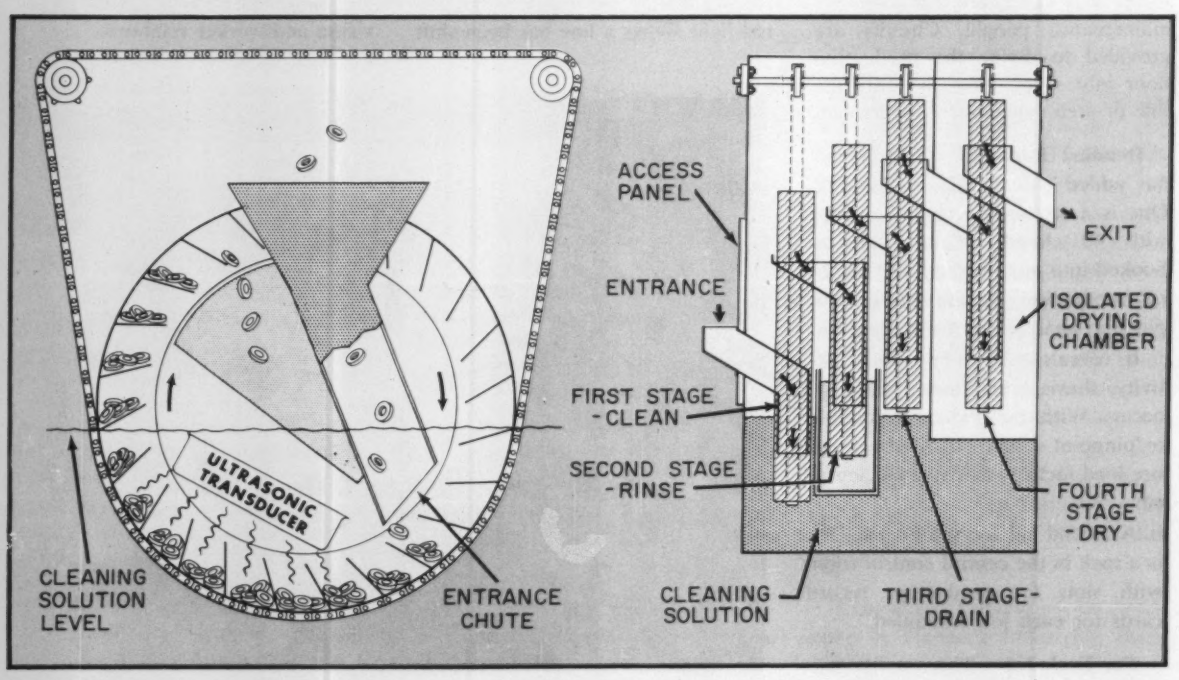
AutoSonex features a series of four rotating wheels with evenly-spaced cubicles which hold the metal parts. As the parts move through the series of wheels they are immersed in a degreasing solution, rinsed, then drained. At the last stage, they pass through an isolated solvent-drying chamber before being discharged.

Parts enter the machine through a sealed chute. The chute's exit is at the bottom—below the wash-solution level. This prevents the escape of solvent odor or steam from the hot-water bath.

Ultrasonic Waves — Incoming parts drop into the transport-wheel cubicles which carry them through the cleaning solution. An electronic transducer directs ultrasonic waves downward onto the parts—before they emerge from the cleanser.

As the wheel rotates it lifts the parts in an arc until they fall out of the cubicles. As they drop, the

Closed System Provides Clean, Dry Parts



UP AND OVER: Incoming parts drop into the first wheel's cubicles. The wheel lifts these parts from the ultrasonic-powered cleaning solution. As the wheel swings up, parts drop into the next position.

Four Cycles Complete Work

parts transfer to an adjoining transport wheel via a chute. This second wheel carries parts through the rinse sump.

Repeating the cycle of bringing the parts to a point above center causes them to again fall out of the cubicles. This time they move on a chute to a third wheel, where parts drying occurs.

The fourth wheel is isolated in its own chamber. Isolation permits solvent or water to evaporate from the parts prior to their discharge. An adjustable air flow controls air movement to effect evaporation. In this manner, solvent consumption and odor are kept at a minimum.

No Venting Problems—Of course, there is no odor when water is used. And since no visible-steam discharge occurs, venting isn't required.

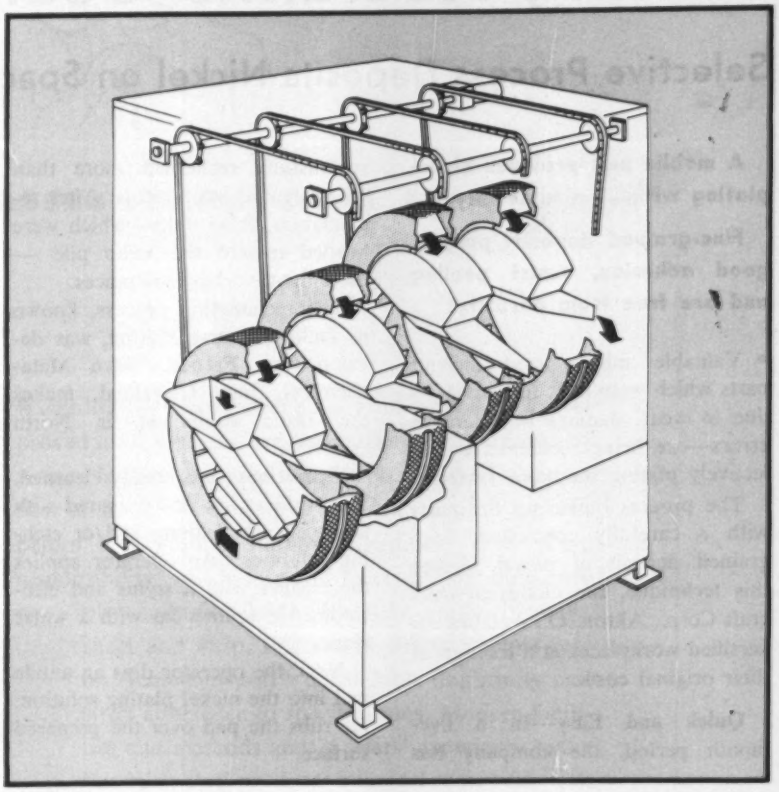
Continuous position-changing of the parts, relative to horizontal, and transfer movements—via the chutes—effect solution drainage from trap areas and blind holes.

When solvent is used, a clean-rinse sump is maintained. An electrically - heated vapor generator suits this need. The solvent boils in the vapor generator. Resultant vapor rises in the chamber to the level of the cooling coils. These coils connect with a cold-water tap to drain.

The generator-still remains sealed to outside atmosphere. A small port near the top of the still relieves vapor pressure into the main chamber of the machine. The main chamber is also sealed from the outside atmosphere.

Maintains Purity—Pure condensate drips off the cooling coils into the rinse sump. At the opposite end of this sump a tube runs off the overflow. The overflow returns to the still. This arrangement maintains a lower liquid-bath level than in the rinse.

The overflow tube from the rinse sump levels off in the immersion-wash sump. Its underside is at the predetermined liquid level of the wash. A drilled hole in the underside of the tube wall permits solvent flow to regulate the proper wash level.



SMOOTH FLOW: Parts enter machine from a sealed chute. Each wheel cycles through a single operation—then sends parts to next station.

Chains revolve all transport wheels. These chains, encircling the wheels' peripheries, are driven by common drive shafts at the top of the machine. Blocks guide the chains and control lateral and longitudinal sway.

There are no friction points within the machine. Shaft bearings and drive-lubrication points are outside the unit. This precludes any interior lubrication.

Keep it Sealed — The machine operates as a sealed unit. A gasketed cover fastens down with quarter-turn, aircraft-type fasteners. The large front-access panel, with the entrance chute welded to it, is also gasketed. Quarter-turn fasteners secure this panel.

The transfer chute from the drain wheel to the isolated drying chamber serves as a restricted orifice. Since the entrance remains sealed, there's no way to displace air within the main chamber. Thus no odors can escape from the chamber.

AutoSonex meets use with metal parts of all shapes. It handles cups, sharp points and balls. And it's adaptable for use with acids as well as water detergents.

Rust-prevention additives are formulated in both solvents and detergents. They give moderate protection but they don't replace normal rust-preventive practices for long periods of time. When heavy-duty rust prevention is a must, a final immersion stage is added to the basic machine.

Plating Reclaims Costly Parts

Selective Process Deposits Nickel on Space-Age Components

A mobile unit provides nickel plating without disassembly.

Fine-grained deposits possess good adhesion, resist peeling and are free from porosity.

▪ Valuable missile and aircraft parts which were unfit for service—due to wear, damage or tolerance errors—are being reclaimed by selectively plating the worn surfaces.

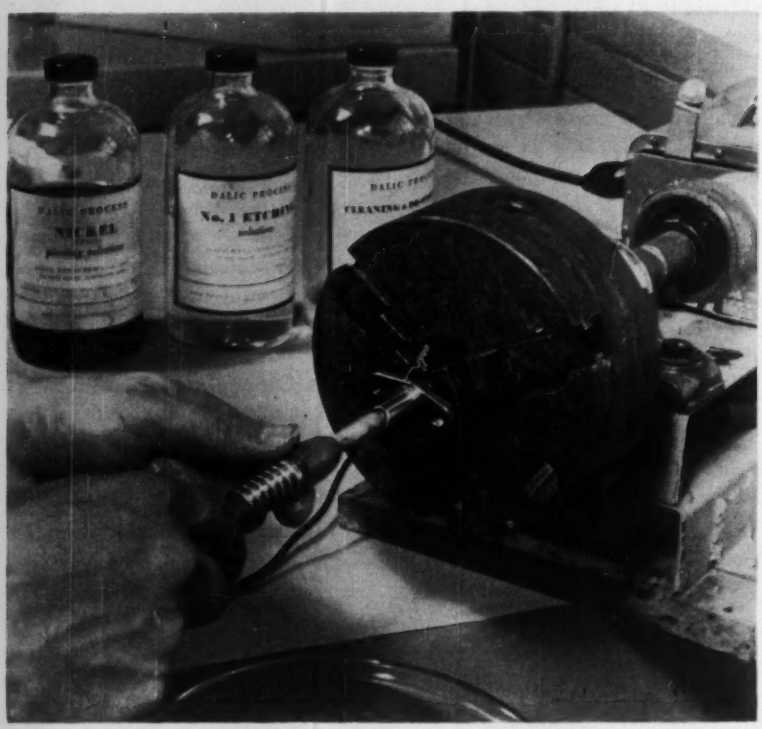
The process builds up the parts with a carefully controlled, fine-grained deposit of nickel. Using this technique, the Goodyear Aircraft Corp., Akron, O., reclaims diversified workpieces at a fraction of their original costs.

Quick and Easy—In a five-month period, the company has successfully reclaimed more than 150 valuable components. After reclamation, these units—which were headed toward the scrap pile—meet tight working tolerances.

The reclamation process, known as Dalic Selective Plating, was developed in France. Sifco Metachemical, Inc., Cleveland, makes the Dalic equipment in North America.

Operations are easily learned. The surfaces are first prepared with Dalic electro-cleaning and/or etching solutions. An operator applies the cleaner with a stylus and electrode. He follows up with a water rinse.

Next, the operator dips an anode pad into the nickel plating solution. He rubs the pad over the prepared surface.



INTERNAL PLATING: An Aircraft-turbine afterburner receives a 0.0004-in. plating of fine-grained nickel on inside diameter and chamfer.

No Tear-Down Needed—Thickness of the nickel plate on the selected area is controlled to within ±0.00005 in. The operator regulates the desired thickness by using dials on the mobile power unit. An ampere-hour meter on the power pack, to which the electrodes are attached, maintains the plating thickness.

Neither immersion of the workpiece in a plating bath nor extensive masking are needed. Even isolated sections of large assemblies are nickel plated — without tear-down —as the Dalic stylus makes contact with the desired area.

Because there's no hydrogen absorption, embrittlement problems are eliminated. This results in little loss of fatigue strength.

Since the plating apparatus is readily portable, the operator often takes the setup to the work, rather than the work to the plating equipment.

Use in Field—As long as electricity is available, nickel plating occurs right on the flight line. Plating can also take place in hangars or in other locations within the plant or on the field.

Goodyear Aircraft uses this plating method for many operations. These include: touch-up work on worn or damaged plating; repair of pitted or scratched surfaces; build-up of mis-machined parts and improvements on the fit of threaded connections.

In addition to nickel, the Dalic process suits other metals. These include: cadmium, tin, zinc, copper, tin-lead, chromium, silver, gold, rhodium and many other metals and alloys.

The process is safe. There's no possibility of electrical shock, and all solutions are non-toxic.

MISSILE STEEL PASSES ITS PHYSICAL AT *Acme-Newport*

Exceeding the most strenuous examination that ever proved a GI's fitness, are the endless tests imposed by Acme-Newport upon its aircraft quality steel. Production of steel for component parts in missiles, rockets, planes and ground support equipment is a grave responsibility, which this mill meets by shipping only physically fit alloy and carbon grades of plate, sheet and strip. Prime and subcontractors rely on Acme-Newport's dependable uniformity and strict adherence to specifications. Modern facilities and methods and 76 years' experience make this basic steel producer a logical source for *your* steel. Contact Acme-Newport before you buy.

Acme-Newport Steel COMPANY
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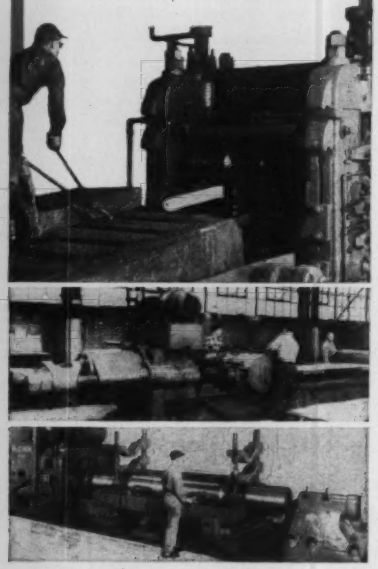
Tensile test at elevated temperature

Hyde Park
ROLLING MILL EQUIPMENT



Hyde Park Engineers are always ready to co-operate with you in selecting and applying the rolling mill equipment best suited to your operation.

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Rolls
Rolling Mill Equipment
Gray Iron Castings

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 93.

Dust Collecting

A 16-page catalog describes effective ways for solving dust-, dirt-, and mist-collecting problems in plants. The text contains detailed explanations of how to achieve maximum results with various models in the company line. Also included are installation recommendations for specific situations. In addition to photographs, cut-away diagrams and floor plans, the bulletin also gives features, dimensions, and specifications on each of the models. (Hammond Machinery Builders, Inc.)

For free copy circle No. 1 on postcard, p. 93

Rust Preventives

A brochure covers a line of products developed to meet the requirements of an integrated, ultrasonic cleaning and rust-proofing system. An ultrasonic-liquid-cleaning concentrate, and the factors involved in the selection of rust preventives for use after cleaning are explained. (Rust-Lick, Inc.)

For free copy circle No. 2 on postcard, p. 93

Indox Magnets

Special properties, uses and applications of Indox I and V are described in a catalog. Typical and minimum characteristics are graphed and summarized. There is also a handy, magnet selector chart, list of stock magnets, and a derating curve for low-temperature operation. (Indiana Steel Products, div. of Indiana General Corp.)

For free copy circle No. 3 on postcard, p. 93

Tiny Switch

Giving a full description of an environment-free, extremely small switch, a data sheet also supplies dimensions, electrical ratings, and mechanical characteristics. The switch meets the pressing demand for miniaturization in mobile, marine, aircraft and railway applications. (Micro Switch)

For free copy circle No. 4 on postcard, p. 93

Leak-Detector Data

A four-page brochure contains tables of conversion factors, formulae, performance charts, hints and other useful information for users of mass spectrometer-type leak detectors. (Consolidated Electrodynamics Corp.)

For free copy circle No. 5 on postcard, p. 93

Rotary Solenoids

A basic-information sheet on rotary solenoids graphically illustrates torque, speed of stroke, type of strokes, power take off and sizes. The units have high torque-to-size rotary motion and high-thrust-to-size piston action for remote mechanical actuation, or remote control of rotary-type switches. (Ledex, Inc.)

For free copy circle No. 6 on postcard, p. 93

Industrial Furnaces

A bulletin covers a full line of industrial furnace equipment for heat processing. It includes a special selection guide which will en-

able readers to select the proper equipment, in relation to their particular heat-process requirements. (Sunbeam Equipment Corp.)

For free copy circle No. 7 on postcard, p. 93

Synchronous Motors

A single-page leaflet describes a line of bracket-bearing synchronous motors. These motors are rated 60 hp and up—at speeds from 500-1800 rpm. Suitable for standard voltage connections (60 or 50 cycle), the motors are built in a variety of enclosures for many requirements. (Electric Machinery Mfg. Co.)

For free copy circle No. 8 on postcard, p. 93

Conveyor Idlers

Forty - eight informative pages make up an engineering and product booklet on belt-conveyor idlers. Included are details of construction, comparison of 10 competitive designs, selection, procedure and examples, engineering tables, dimensions, and specifications. The catalog illustrates and describes the basic types of idlers used in all types of service. (Hewitt-Robins, Inc.)

For free copy circle No. 9 on postcard, p. 93

Lubricant

Wide industrial uses of Molykote Type G, a grease-consistency lubricant, are described in a four-page bulletin The bulletin describes how this lubricant reduces galling, seizing and metal pickup in high-pressure and high-temperature applications. Typical uses include: machine wear-in, fretting, threaded connections, highly-loaded gears, cold-metal forming and press fittings. Instructions for applying the lubricant are also presented. (The Alpha-Molykote Corp.)

For free copy circle No. 10 on postcard, p. 93

Speed Reduction

Modern methods of speed reduction, with compact, shaft-mounted units in a wide range of sizes and horsepowers, are described in a 64-page bulletin. Besides an expanded line of speed reducers for mounting on shafts of driven machines, the

Low head room, single suspension hoist with motor driven trolley.

The PAY-OFF is PROFIT

with Shepard Niles JOB-MATED Hoists

Wasted overhead space in your plant is eating up profits! Make it pay off by installing an overhead traveling hoist to free valuable floor space and aisles for production or storage, cut handling costs, and increase overall plant efficiency.

To give long, economical service, the hoist must be matched to the job. At Shepard Niles, we specialize in providing **"Job-Mated"** hoists that have the ideal combination of capacity, clearance, speed and controls needed to match performance to precise job conditions. Custom built to your most exacting specifications.

Whatever your requirements, check first with Shepard Niles—you're sure to find the **right** hoist for the job among the thousands of types and sizes available.

To find out how Shepard Niles **"Job-Mated"** hoists will pay off in your material handling operation, send for a free descriptive bulletin, and ask to have a Shepard Niles representative call.

Balanced Drive Hoists from 250 lbs. to 20 tons

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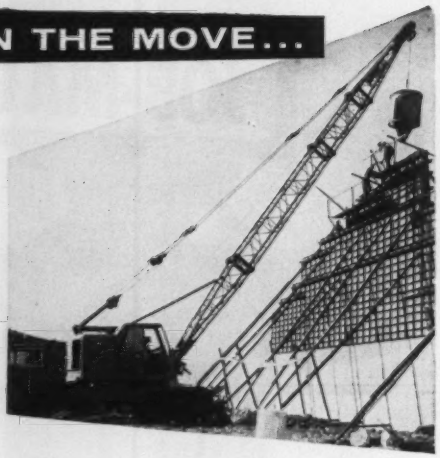

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GEARS to match the speed, size, and power of modern machines are a Fairfield specialty. This is possible because Fairfield is a leader in utilizing the most advanced methods, machines, and techniques for producing better gears. By specializing exclusively in "Fine Gears Made to Order", Fairfield has become one of America's largest independent producers of these parts.

If you use gears in the product you make, we believe it will pay you, as it has others, to become acquainted with FAIRFIELD—the place where fine gears are produced to meet your specifications EFFICIENTLY, ECONOMICALLY! Fairfield's production facilities are unexcelled. *Call or Write.*

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FREE LITERATURE

bulletin also presents reducers for flange mounting, vertical shafts, right angle drives and screw conveyor drives. Construction details, dimensions, prices, and installation information are given in sections illustrated with photographs and engineering drawings. (Dodge Mfg. Corp.)

For free copy circle No. 11 on postcard, p. 93

Gears

Advantages in using hardened and precision-ground gears is presented in a 12-page booklet. New methods, facilities, and applications are fully illustrated and described in detail. The booklet also shows and discusses the various applications for precision-ground gears. (Philadelphia Gear Corp.)

For free copy circle No. 12 on postcard, p. 93

Starters

Engineering data on ac magnetic starters is presented in an eight-page illustrated bulletin. Available in a full range of sizes from Size 0 through 4, the starters feature sturdy construction, simplicity of design, and fast, easy maintenance. (The Clark Controller Co.)

For free copy circle No. 13 on postcard, p. 93

Cooling Systems

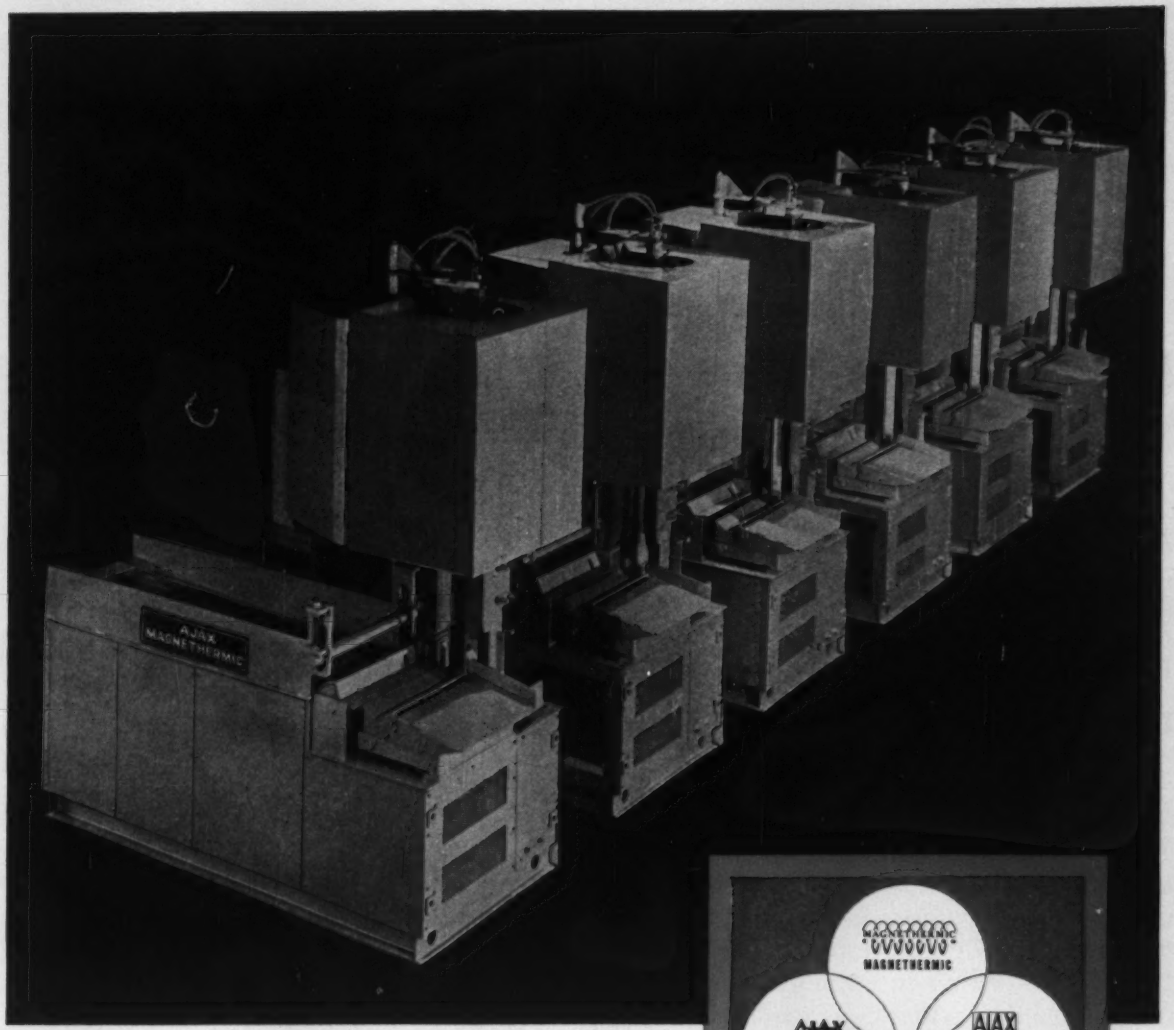
Refrigeration systems, for cooling electronic devices to temperatures ranging from 3.5° to 200°K, are described in a short brochure. (Air Products, Inc.)

For free copy circle No. 14 on postcard, p. 93

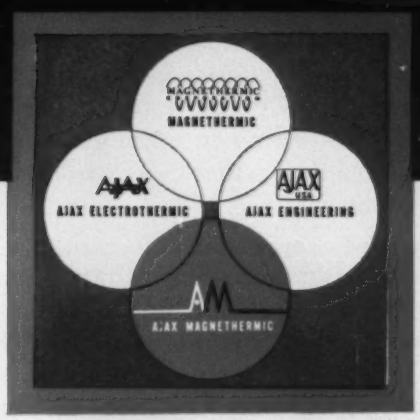
Electroplating

Resistance to corrosion, either by body acids or by air oxidation, and resistance to mechanical or abrasive wear are the subjects of a six-page article. The technical article covers the history of electroplated jewelry and the problems encountered in testing and evaluating. Thickness measurement, corrosion resistance, tarnishing, oxidation, wear resistance and hardness measurements are discussed. (Sel-Rex Corp.)

For free copy circle No. 15 on postcard, p. 93



These six 400 KW vertical Billet Heaters heat stainless steel billets—5" —10" dia. x 28" long, to 2300° F at the rate of 12,000 lbs. per hour.



WATCH AM

FOR THE NEW IDEAS IN HEATING AND MELTING BY INDUCTION

Vertical Steel Billet Heaters, one of many products of AM, for the heating or melting of metals by Induction.

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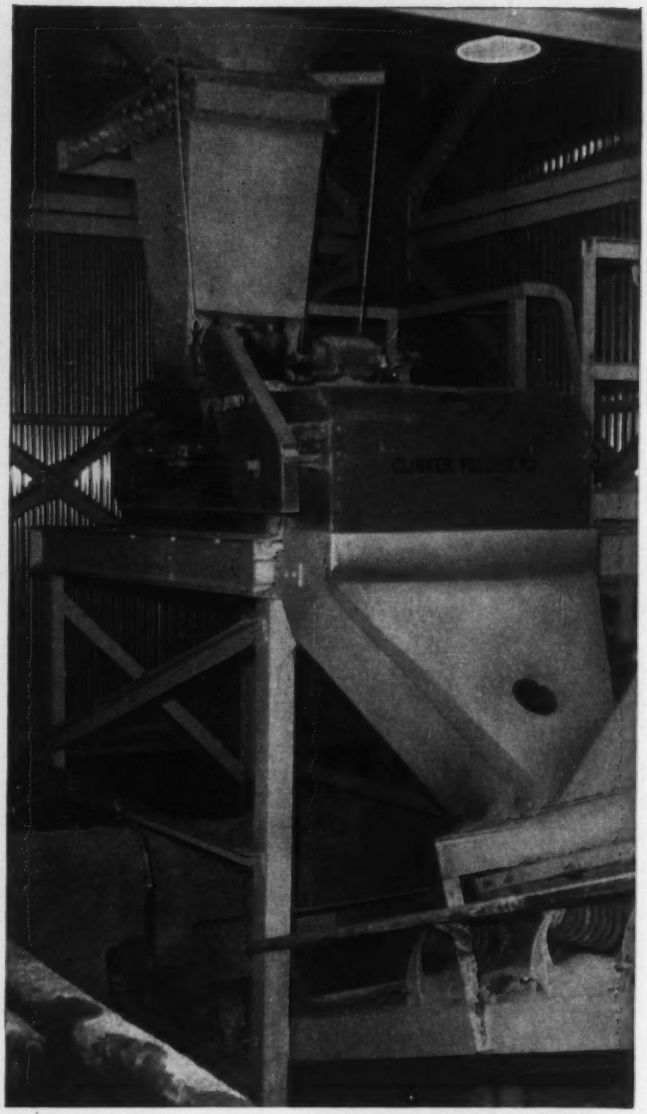
JEFFREY Weigh-Feeding helps achieve peak efficiency in new cement plant

Arkansas Cement Corporation in Foreman, Arkansas has one of the nation's most modern and highly automated cement plants. Designed and built by Kaiser Engineers of Oakland, California.

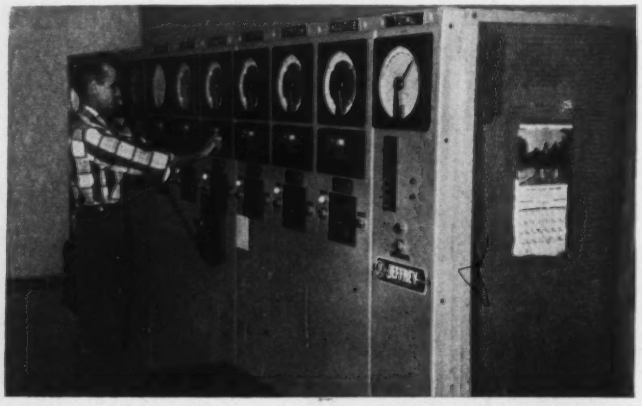
JEFFREY WAYTROLS®—machines which weigh materials as they feed them—were integrated into the automated system for handling the dry raw materials. These units continuously and automatically proportion by weight and feed materials to the various functions in the mill building. Complete instrumentation of this feeding equipment permits immediate adjustments as required in processing.

If you're interested in automating your conveying and processing operations and lowering costs, it will pay to consult Jeffrey. For information, write The Jeffrey Manufacturing Company, 925 North Fourth Street, Columbus 16, Ohio.



Jeffrey Waytrols like this one continuously proportion and feed chalk, iron ore, additive materials, clinker and gypsum at the huge Arkansas Cement plant; capacity is 1,400,000 barrels per year of Foreman Portland Cement and similar products.

One of two panels of Jeffrey instruments from which feed rates of individual Waytrols are controlled. Total feed rates can also be adjusted for overall-mill control.



JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT...
TRANSMISSION MACHINERY...CONTRACT MANUFACTURING

FREE LITERATURE

Continued

Money-saving products and services are described in the literature briefed here. Publications are free with no obligation. Just circle the number on the free postcard and mail.

Steel Tubing

Both seamless-steel tubing and electric-welded-steel tubing are described in an eight-page catalog. Carbon- and alloy-steel grades are covered in mechanical, pressure, aircraft - mechanical and airframe categories. In addition, a section covers fabrication and forging of steel tubing into finished or semi-finished tubular parts. (Ohio Seamless Tube Div., Copperweld Steel Co.)

For free copy circle No. 21 on postcard

Melting Furnaces

Nonferrous melting furnaces are described in a 12-page bulletin. Illustrations cover: pot furnaces; crucible furnaces; double-chamber, dry-hearth furnaces; and large capacity reverbatory furnaces. These furnaces range in capacity up to units capable of melting 60,000 lb of aluminum per hour. (Hevi-Duty Electric Co.)

For free copy circle No. 22 on postcard

Laboratory Monitor

Features of a laboratory monitor are described in a short brochure. The instrument meets use in general laboratory counting, hot-cell monitoring and classroom demonstration. It features five counting ranges from 50 to 500,000 counts per minute. (The Victoreen Instrument Co.)

For free copy circle No. 23 on postcard

Electric Fork Trucks

A four-page brochure describes a 5000-lb capacity, battery - powered fork truck. Complete engineering and dimensional specifications are given. One page describes standard features such as a carbon-pile resistor, non-plugging controls and roller-type uprights. (Clark Equipment Co.)

For free copy circle No. 24 on postcard

Steel-Bonded Carbides

Carbide tips or entire tools, to withstand high temperatures or corrosive media, can be made right in the shop. Conventional tools machine stainless steel-bonded carbides. Available in two grades, these materials are produced by powder metallurgy methods which imbed tiny crystals of titanium carbide in a softer matrix of stainless steel. (Sintercast Div., Chromalloy Corp.)

For free copy circle No. 25 on postcard

Cutting Tools

Cast-alloy cutting tools consist essentially of chromium and tungsten crystals rigidly held in a cobalt matrix. These tools offer advantages over high-speed steel and cemented-carbide tools in many applications. Three grades of these tools are available. Grades range from Rc 58 to Rc 63. Many sizes and shapes are also available. (Crobalt, Inc.)

For free copy circle No. 26 on postcard

Scale Models

Twenty vessels, eight heat exchangers and eleven pumps of three different types are available in molded expandable polystyrene. This model equipment is easily worked with a knife or hand saw and can be glued, pinned or screwed. (Industrial Model Supplies, Inc.)

For free copy circle No. 27 on postcard

Liquid Spring Action

Fully illustrated, a handbook describes the simplicity of operation of liquid springs. These parts use liquid compressibility to provide a resilient resistance. Liquid trapped in a closed cylinder generates a force called a preload. As a moving piston reduces the volume in the cylinder, the spring force increases. Liquid springs provide up to 40 times the force of equivalent springs

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FREE LITERATURE

and can approach the force of expansion of explosives. (Taylor Devices, Inc.)

For free copy circle No. 28 on postcard

Take-Off Machines

Available in several models, extruder take-off machines are described in a 12-page booklet. Each unit hauls all extrusion profiles of metal, plastics, wire, wood or glass. Drives may be hydraulic, electronic constant speed, or electronic with synchronized or constant-tension control. The units are adjustable to any extrusion size. (Farris Universal Machine Co.)

For free copy circle No. 29 on postcard

Pyrometer Controllers

Principles of operation are discussed in a four-page data sheet on indicating pyrometer controllers. Measuring and control systems are outlined—along with process applications. Standard ranges with thermocouple calibrations are from —300° to +3000°F. Differential between relay pull-in and drop-out is less than 0.25 pct of the scale span. (Atlantic Pyrometers, Inc.)

For free copy circle No. 30 on postcard

Electrode Data

Seven data sheets for ac and dc electrodes include four for electrodes used in mild-steel welding, one for medium-carbon-steel, one for high-carbon-steel and one for railwear. Typical applications for each electrode are described. (National Cylinder Gas Div., Chemetron Corp.)

For free copy circle No. 31 on postcard

Honeycomb Data

Formulas and worked-out examples for stress computations on typical sandwich structures round out a 45-page brochure which is, in effect, a handbook on how to design with honeycomb. Included are large sections on such aspects of honeycomb construction as sandwich theory, impact, fatigue, environment, selection of facings, selection of adhesives, surface preparation for bonding, selection of core material, tooling methods, quality control and many other considerations vital to honeycomb design. (Hexel Products Inc.)

For free copy circle No. 32 on postcard

Indicating Gages

Miniature vertical-type indicating gages, with 5-in. scales for measuring and indicating draft, pressure, differential pressure, temperature and pneumatic signals, are described in a 12-page brochure. This brochure shows such gage features as scales and ranges available, mounting dimensions and lighting details. (Republic Flow Meters Co., Rockwell Mfg. Co.)

For free copy circle No. 33 on postcard

Automatic Boilers

A four-page bulletin describes and illustrates high- and low-pressure automatic boilers. These units range from 20 to 100 hp sizes. Various models are available. Some are fired by oil, others by gas and some by a combination gas-oil. Hot-water units especially designed for forced-circulation heating applications are also covered. (Orr & Sembower, Inc.)

For free copy circle No. 34 on postcard

Furnace Equipment

Heat-treating equipment for stainless steel appears in a 16-page bulletin. The bulletin covers continuous annealing and descaling of stainless steel in wide or narrow-strip widths, in sheets, in tubing, in strands or coils and in bars. (Drever Co.)

For free copy circle No. 35 on postcard

Dry-Film Lubricant

Poxylube is a new moly-base, dry-film lubricant featured in a four-page brochure. No expensive surface preparation is required prior to applying the lubricant. The new lubricant exceeds the requirements of MIL-L-25504 A. (Poly Chem, Inc.)

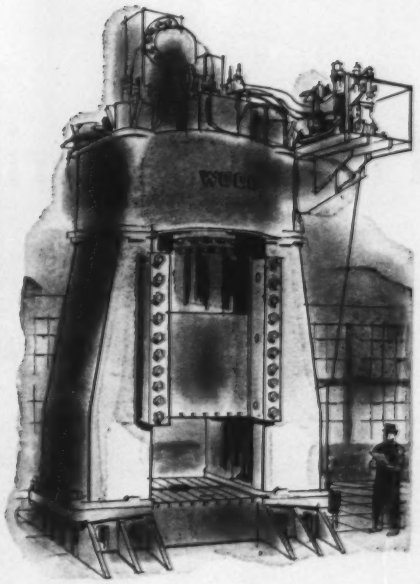
For free copy circle No. 36 on postcard

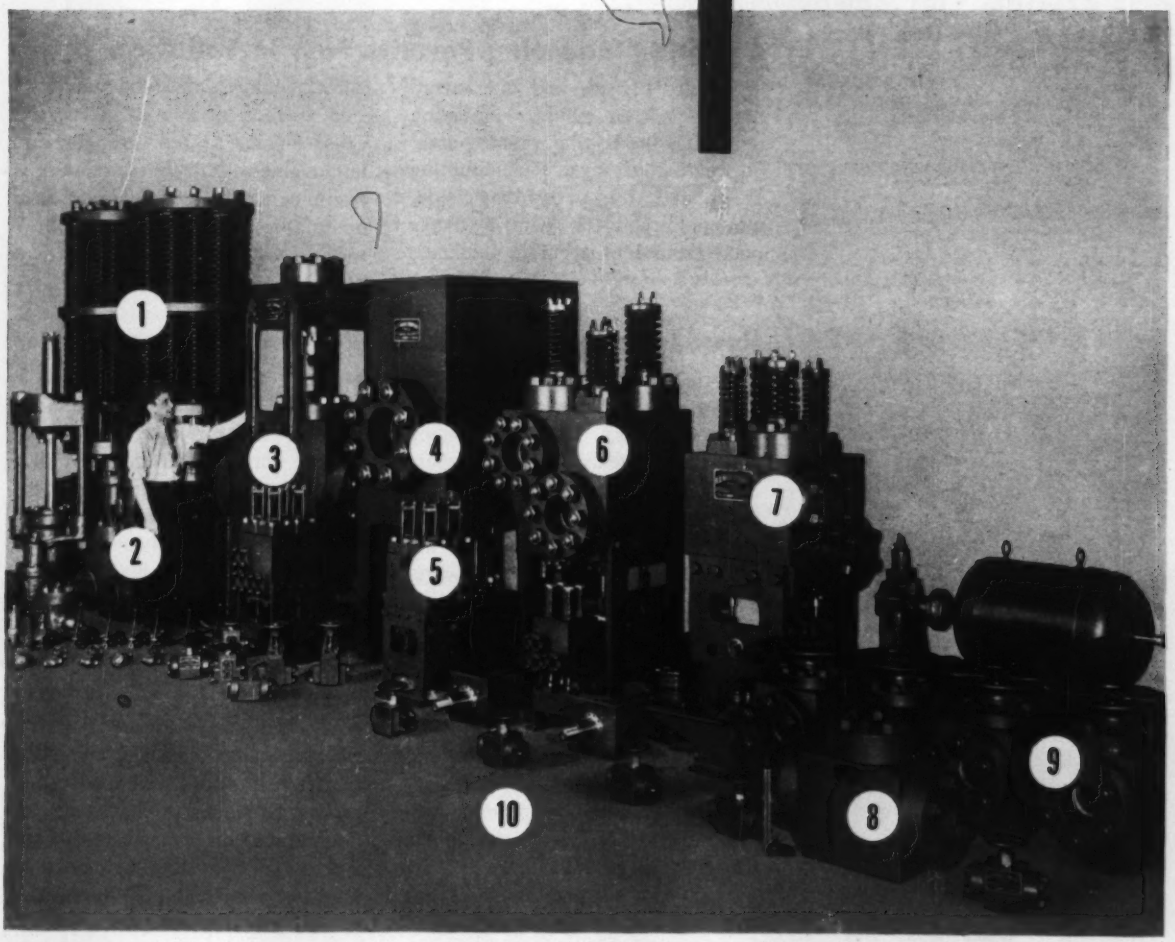
Every valve you need for a complete hydraulic system . . . from WOOD

Need a special valve or a complete hydraulic system? Call on R. D. Wood Company for help from men who know their high pressure valves. Take the line-up below, all Wood valves from one hydraulic forging press installation, working pressure 4500 psi. Note the broad range of sizes and types, from the small Stop and Check Valves to the large 6″ x 8″ Shock Alleviator Valves. They have been developed from years of experience in designing and building hydraulic equipment. Whatever your requirements, our engineering staff can design and apply the correct valves to do the job. Write today for complete information contained in the Wood brochure, "High Pressure Hydraulic Valves."

R. D. WOOD COMPANY

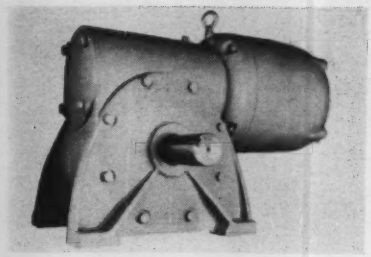
PUBLIC LEDGER BUILDING • PHILADELPHIA 5, PENNSYLVANIA





1. 6″ x 8″ Shock Alleviators **2.** 2½″ x 4½″ Twin Tilting Valve **3.** 9″ Accumulator Shut off Valve **4.** 9″ Accumulator Safety Shut off Valve **5.** 1½″ Mandrel Gear Control Valve **6.** 6″ Control Valve **7.** 4½″ Control Valve **8.** 4″ Check Valve **9.** 4″ Stop Valves **10.** Misc. Stop, Check and Control Valves

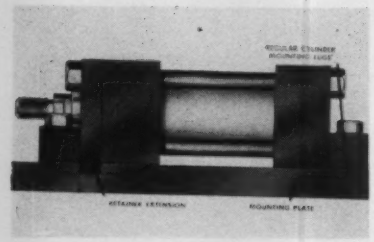
New Materials and Components



Worm Gearmotor Offers Aluminum Housing

Latest addition to a line of motors, a worm gearmotor has 6-in. center distance. Its housing is of heat-treated alloys of aluminum for lighter weight, greater tensile strength, faster heat transfer, better corrosion resistance and shock resistance. The gearmotor is available in 3-, 5-, 7½-, and 10-hp units —foot mounted, ring mounted, or shaft mounted. (Electra Motors, Inc.)

For more data circle No. 37 on postcard, p. 93



Cylinder Mounting Permits Fast Installation

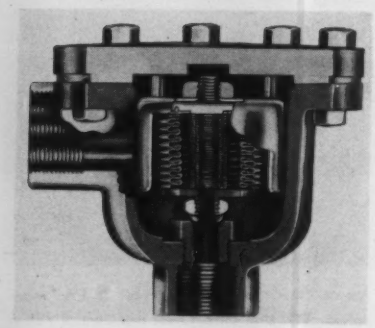
Simple, rugged, and guaranteed not to shift, a cylinder mounting eliminates the bolting, pinning and/or welding of keys. The mounting is created by providing side-mounted cylinders, with a flange plate ground to accurate thickness and extending beyond the mounting-side surface of the cylinder. Because of its rugged strength and immovable solidity, the mounting is recommended for maximum-load operation. (Flick-Reedy Corp.)

For more data circle No. 38 on postcard, p. 93

Ready-Made Castings Fulfill Rush Needs

Perfectly-made cast-iron standard shapes and forms are available for prompt delivery. They solve many rush requirements for procurement of quality castings and materials for fabrication of machines, tools, jigs, and fixtures. The castings are available from local foundry warehouses. The quality of the castings provides the following properties essential to precision equipment: internal structural stability which insures dimensional accuracy; density and uniformity permitting extremely fine accurate finish by grinding to a high polish. (Standard Foundry Products)

For more data circle No. 39 on postcard, p. 93



Steam Trap Features Non-Cycling

Modulating open to degrees of flow, a steam trap offers no continuous bellows flexing from on to off. Modulated operation permits infinite bellows life. The design of the trap permits use of proportionately greater orifice for extremely high capacity—460 in. on ½-in. size will handle 17,500 lb condensate per hour at 125 psig. The trap positively dead ends with no 10-second weeping every closing cycle. Also, the trap improves heat recovery of process equipment, removes all condensate and air from the trap, and assures a dry line ahead of the trap. One-size trap will operate from 1 to 150 psig without orifice change. (The C. E. Squires Co.)

For more data circle No. 40 on postcard, p. 93

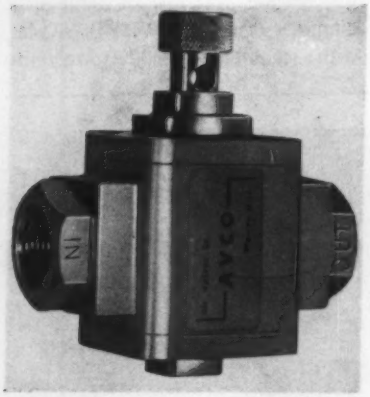
Sponge Rubber

With a dense, uniform, non-absorbing, closed-cell structure, a new fluorosilicone sponge-rubber compound resists fuels and lubricants at high temperatures. It also possesses immunity to aging, ozone and weather hardening. In addition, it has excellent dielectric properties and exhibits good compression-set resistance. This material is recommended for vibration dampening, fairing strips and soft gasketing. (The Connecticut Hard Rubber Co.)

For more data circle No. 41 on postcard, p. 93

Bleed Valve

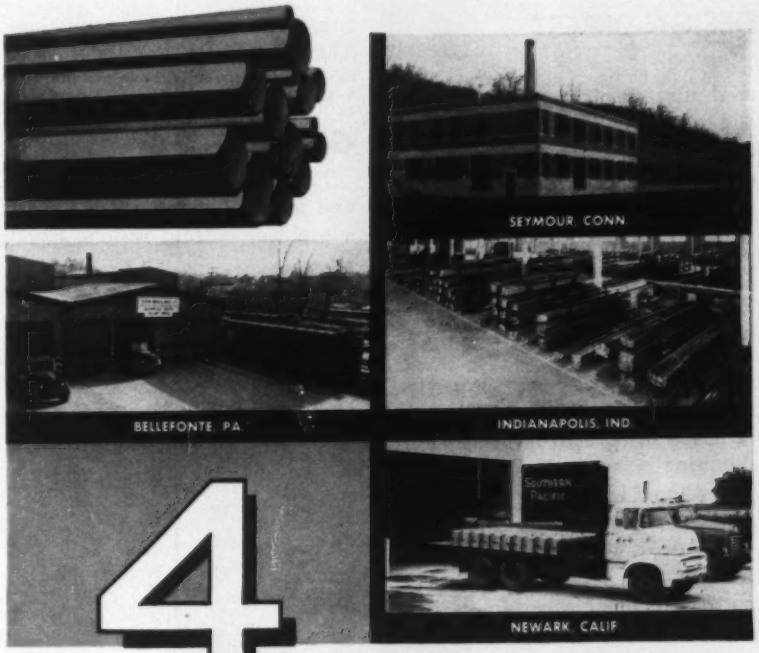
For use on any air or hydraulic supply line, a snap-action combination shut-off and bleed valve has a compact aluminum-alloy body. It also has a positive, instantaneous shut-off action. A quarter turn of an easy-action thumb nut completely stops all line pressure, and automatically bleeds off pressure on the down-stream side. Pressure range is 0 to 150 psi, and it is presently available for ⅜-, ½-, and ¾-in. air or hydraulic lines. (Air Valves Co.)



For more data circle No. 42 on postcard, p. 93

Pickling Solution

Used for aluminum castings, a non-fuming pickle does not heat up, nor does it give off brown nitrogen oxide fumes when in use. It is a powder added to nitric acid to form a stable operating solution. Long immersion times produce snow-white castings. Also, work does not fume on transfer. The pickle can be



4 Titan Brass Mill Depots give OVERNIGHT DELIVERY to most users!

Titan is located coast-to-coast for serving the daily requirements of warehousers, distributors, and users of brass rods. If you are within 400 miles of Titan's Northeastern, Eastern, Mid-western or Western mill depots, you can have overnight delivery on quality Titan brass.

Titan carries in stock 3,000,000 pounds of Free-Cutting Brass rounds (⅛" to 12"), hexagons (⅛" to 4½"), rectangles and squares, half-rounds, half-ovals, angles and octagons; Naval Brass, Free-Cutting Commercial Bronze, and Leaded Nickel Silver rods.

Free-Cutting Rod sizes over ⅛" to 2¼" are chamfered on both ends and are in uniform 12 ft. lengths for faster and more economical operation of automatic screw machines.

Special Titan tempers and modified free-cutting brass alloys are designed for machining in conjunction with severe knurling, deep thread rolling, deep roll stenciling, spinning, staking, flattening, bending, or flaring and expanding.

Titan depot facilities also allow quick delivery on orders of Titan brass, copper and aluminum forgings, bronze welding rods, brass wire, brass pressure die castings.

May we say more? Call Titan's nearest office, distributor or depot for outstanding brass service.

45 YEARS OF QUALITY BRASS

Write us on your letterhead if you wish to receive the weekly stock list of the Titan Brass Mill Depot in your area.

Titan® METAL MANUFACTURING CO.
DIVISION OF CERRO DE PASCO CORPORATION
Bellefonte, Pa. • Newark, Calif. • Offices and Agencies in Principal Cities

used after an alkali etch to whiten and selectively remove free silica on the surface of castings prior to anodizing, ball burnishing, chromate conversion coatings, and plating operations. (Conversion Chemical Corp.)

For more data circle No. 43 on postcard, p. 93

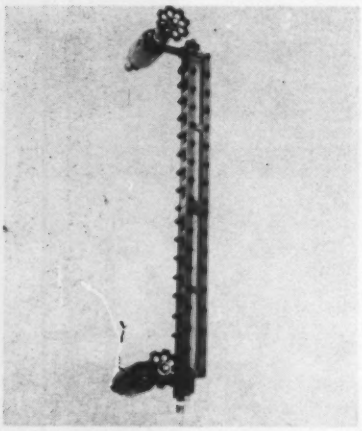
Metal Hose

Featuring a patented, protective stainless-steel covering, flexible metal hose can be used in installations requiring a vertical or horizontal arc, without brackets or supports of any kind. The covering is made in two halves with extended flanges welded over a seamless, helically-corrugated inner core. In straight-line installations the flanges prevent sagging or whipping and control flexing in one direction, eliminating stresses and strains. By coupling two lengths of the hose with the flanges at different angles, flexing can also be controlled in opposite directions on the same installations. (Guardflex Metal Hose Inc.)

For more data circle No. 44 on postcard, p. 93

Gages

Electrically-heated gages serve well in installations where there is a problem heating various liquids



to get an accurate liquid level, and steam is not available. They are also practical for installations where there is need for very close control of temperatures in the gage glass, and for cold-weather applications to prevent gage freezing and breakage. The design employs a cartridge heater with a ½-in. diam stainless-steel sheathed manganese - nickel wire. The gages are equipped with electrically-heated jacketed valves; the gages are available in explosion-proof construction where required. (Jerguson Gage & Valve Co.)

For more data circle No. 45 on postcard, p. 93

Indium Spheres

Used in forming alloy junctions in germanium transistors and diodes, ultra-pure precision spheres are 99.9995-pct pure. This ultra-pure material should help germanium-semiconductor manufacturers increase their production yields. The indium spheres insure reproducible results in forming the junction to the germanium crystal. The spheres are available in a range of diameters from 0.001 to 0.250 in., with diameters held down to

EXECUTIVE REPORT #9

THEY BLAST BRIDGES BEFORE THEY'RE BUILT

Blast Cleaning Structural Steel Provides Big Savings

Prominent structural steel fabricating plants now blast clean all shapes and sizes of structural steel channels, angles, plates, bar and rod stock—in Wheelabrator cabinets.

The straight-line production made possible by Wheelabrator airless blast cleaning has improved manufacturing efficiency and reduced their cleaning costs substantially. And the shot-blasted finish has proven to be ideal for lasting surface protection of the finished structural members.

Wheelabrator's unequaled experience in descaling structural steel is at your service. Send for new informative bulletin No. 152-D. Write to Wheelabrator Corp., 510 S. Byrkit Street, Mishawaka, Ind. In Canada, P. O. Box 490 Scarborough, Ont.

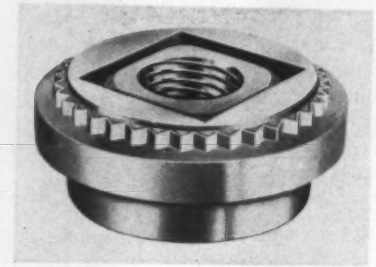
WHEELABRATOR
AIRLESS BLAST EQUIPMENT

±0.0001 in. The spheres automatically load into alloying jigs since this sub-component can roll. (Accurate Specialties Co., Inc.)

For more data circle No. 46 on postcard, p. 93

Fastener

Self-clinching, a fastener provides load bearing threads in metal sheets too thin to thread, with captive floating nut permitting up to 1/32-in. adjustment. This adjustment

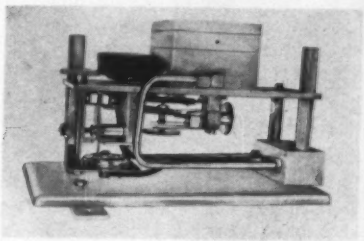


compensates for slightly off-center holes in mating attachment. The fastener is made of carbon steel with rust-resistant finish on retainer and nut. It is suitable for all materials with Rockwell hardness less than B-70, and sheet thicknesses from 0.040 in. up. Thread sizes are from 4 to 10. (Penn Engineering & Mfg. Corp.)

For more data circle No. 47 on postcard, p. 93

Signal Converter

A pneumatic signal converter converts the transmitted signals from square-root flowmeters into linear signals. This permits use of receivers with evenly-graduated charts or linear ratioing controllers. The con-



verter can also be used to convert any pneumatic signal into a corresponding output signal of different characterization. (Brooks Rotameter Co.)

For more data circle No. 48 on postcard, p. 93

NEW BOOKS

"Work Improvement," by G. C. Close, Jr., details the use of a systematic, organized method for solving cost problems in a practical manner. The author suggests how to eliminate waste in time, energy and material. He gives step-by-step applications of such tools as process charts, operation charts and multiple-activity charts. He also discusses work-distribution analysis, procedure-flow techniques, paperwork control and forms design. In addition, he covers: the analytical application of work sampling; principles of motion economy; the comparative utility of job simplification versus job enlargement; and the value of imaginative thinking. Actual case histories support and illustrate each technique. "We have no God-given right to the highest standard of living in the world; we must continually work to earn it," Mr. Close concludes. Understandably, the book's section headings

EXECUTIVE REPORT #18

PROFITABLE FOR DEBURRING

Wherever machined parts are produced, burrs are a costly problem. And burr removal becomes excessively costly when hand labor is required. Wheelabrator *airless* blast deburring equipment, such as the table type illustrated, offers important advantages in cutting the cost of deburring. Its powerful media blast removes burrs uniformly, even from recessed areas, leaving an attractive non-directional finish. Wheelabrators readily fit into automated production lines, eliminate human error, and drastically reduce manual labor.

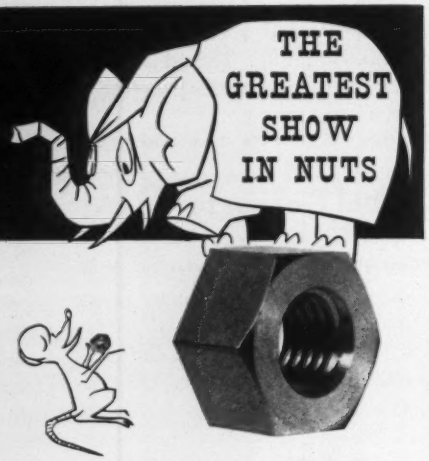
Over 100 successful deburring applications prove Wheelabrator's cost-cutting ability

A wide variety of Wheelabrator equipment is available for batch type or straight line deburring operations. For engineering consultation without obligation, write to Wheelabrator Corp., 510 S. Byrkit St., Mishawaka, Ind. In Canada, P.O. Box 490, Scarborough, Ontario.

Write for this Handbook illustrating deburring, deflashing, and cleaning operations with Wheelabrator Equipment. Ask for Catalog 143-D.

WHEELABRATOR
AIRLESS BLAST EQUIPMENT

Fischer presents . . .



RANGE OF SIZES AND THREADS

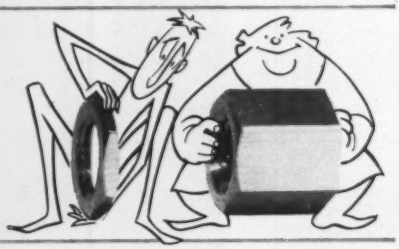
Here you see the smallest and largest hex sizes produced by Fischer with the finest and coarsest standard threads. The miniature is 1/8" x 3/64" with 0-80 threads . . . jumbo is 1 1/16" x 39/64" with 5/8-11 threads.

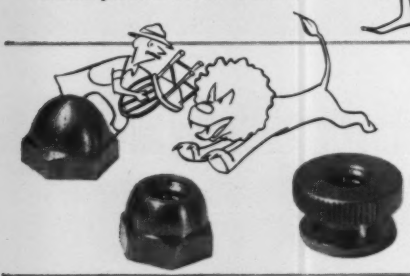
RANGE OF THREAD DIAMETERS

Turned from 1 3/16" hex stock, these nuts illustrate variation in I.D. obtainable in same blank size (depending on thread specified). One is 1 1/16" I.D., the other only 1/4".

RANGE OF LENGTHS

Both these nuts are 5/8" O.D. with 7/16" thread diameter. The husky one is 5/8" long, the other 3/32". In specific nut sizes, maximum length is determined by thread pitch and thread I.D.





RANGE OF STANDARD TYPES

In addition to hexagon nuts, Fischer also supplies cap (acorn), open-end cap, knurled thumb, battery and fixture nuts in a range of sizes with standard/special threads.

ODD SIZES, SHAPES & THREADS

. . . are another specialty with Fischer. In fact, we have produced more than 3400 different types of non-standard brass and aluminum nuts. What do *you* need?

there's no premium for precision at

Fischer

FISCHER SPECIAL MFG. CO.
445 Morgan Street • Cincinnati 6, O.

FISCHER IS THE LEADING PRODUCERS OF PRECISION TURNED BRASS AND ALUMINUM NUTS . . . TO YOUR SPECIFICATIONS!

Whatever your requirement, Fischer can assure you of premium quality and prompt "on schedule" deliveries at competitive prices. WRITE FOR CATALOG FS-1000.

8902-FS

NEW BOOKS

repeat the following admonition: "Aim, Observe, Question, Think, Decide, Act." 338 pp. $7.75. John Wiley & Sons, Inc., 440 Park Ave., New York 16.

"Manual of Machinability and Tool Evaluation" by Antoni Niedzwiedzki. This book bridges the gap between theory and practice, and between European and American concepts of machining with carbides and high-speed-steel tools. Ideas put forth by many technical groups—both here and abroad—have been absorbed, evaluated and analyzed by the author. The manual shows how it's possible to predict the amount of tool wear obtained in a given cutting time from a given set of machining conditions. It also explains how to calculate power consumption in advance of actual machining. Seven chapters cover tool-life formulas, tool-life criterion, chip-load and workpiece hardness, tool geometry test records, tool inspection, machinability classification and machine selection. 107 pp. $6.00. Huebner Publications, Inc., 1975 Lee Rd., Cleveland 18.

"The Management of Time," by J. T. McCay, sets forth a practical method for overcoming time pressures today—while preparing for the much greater demands of the coming decade. Going beyond superficial time-saving techniques, the author underscores the intimate relationship between time pressures and the rate of a man's personal growth. "If a man is chronically short of time," he says, "he is probably being swamped by the growing challenges of his job." The book is structured in four parts. Part I outlines the challenge of change and the working principles you can use to meet a change successfully. Part II describes three bases for increasing your rate of growth and overcoming time pressures. The third part offers some powerful tools of time management—the verbal and non-verbal techniques which can

HOT STEEL

ON THE MOVE

Long and fiery steel bars press between and wear away at this 14,000 pound roll and many others like it in Keystone Steel & Wire Company's blooming mill, Peoria, Illinois.

At frequent intervals the rolls must be pulled out of the presses and turned down to keep dimensions reducing at the proper rate. Picking up the rolls and transporting them to the machine room is a routine assignment for two Broderick & Bascom 30-foot Slings. Dependable slings speed the job, increase the safety factor, pay dividends in extra life.

Where heavy lifting is required, improve job efficiency with Yellow Strand Slings! Broderick & Bascom Rope Co., 4203 Union Blvd., St. Louis 15, Mo.

Yellow Strand

★ WIRE ROPE ★ SLINGS ★ CLIPS

SILENT HOIST KRANE KAR

360° SWING

2 SIZES:

MODEL FAX—12,000 lbs. cap.

MODEL FAY—20,000 lbs. cap.

THE LOW COST OF LIFTING WITH...

SILENT HOIST KRANE KAR

360° BOOM SWING—*Now . . . another addition to the famous family of Silent Hoist* **KRANE KAR** *. . . the original Mobile Swing Boom Crane!* **BOOM ROTATION:** *All-Hydraulic 360° continual rotation on heavy-duty double-race ball-bearing turntable.* **BOOM:** *15/22 ft., manual or hydraulic telescoping.* **TRANSMISSION:** *Hydraulic power shift directional in combination with flywheel torque converter.* **STEERING:** *Full time power steering, finger-tip control.* **ENGINE:** *Heavy duty 6 cylinder valve-in head type.* **BOOM TOPPING:** *Horizontal to highest vertical in only 8 seconds.* **BOOM HOISTING:** *Load block 3 parts of line 25 to 55 fpm.* **TIRES:** *Dual pneumatic tires on traction axle for high flotation and extra blow-out protection.* **TOTAL VISION AND SAFETY:** *No obstruction in any position of load or crane; operator fully protected through 360° rotation of boom. Write for complete details in illustrated bulletin #99.*

180° BOOM SWING—*The Standard widely favored All-Hydraulic or Mechanical 180° swing boom crane models. Lifts, carries, and places any load up to 12½ tons. One engine powers the machine for travel and all crane applications—finger-tip control. Front traction wheel drive supports chassis and crane load. 2 geared speeds for hoisting, topping, and swinging. No tail swing—Boom never passes over Operator's head. Write for complete details in illustrated bulletin #79.*

SILENT HOIST KRANE KAR

180° SWING

5 SIZES:

1½, 2½, 5, 10, 12½ tons

SILENT HOIST & CRANE CO. · BROOKLYN 20, N.Y.

NEW BOOKS

accelerate the pace of your decisions and actions. In his concluding section, the author brings together all the foregoing concepts and methods in a complete plan for time management. Here he tells you how to set up a program flexible enough to meet the challenge of rapid change; vital enough to motivate you to double and redouble your creative output; and comprehensive enough to be a vehicle for self-development regardless of your age, position, location or kind of work. 178 pp. $3.95. Prentice-Hall, Inc., 70 Fifth Ave., New York 11.

"The Promise of Economic Growth: Prospects, Costs, Conditions" explains that economic growth has become a political as well as an economic issue. Without advocating specific growth policies, this book sets the problem in its context. It thus provides a foundation for intelligent discussion and decision. Indirectly, the book answers the growth zealots who preach the gospel of growth, the more the better, heedless of costs or consequences. 55 pp. $1.00. Chamber of Commerce of the United States, Washington 6.

"Electrical Safety" by H. W. Swann. Safety in the use of electricity is a matter of great importance not only to engineers and technicians, but also to the general public. Universal use of electricity in our public buildings, factories, streets and homes for power, lighting and heating—as well as in hospitals and clinics for physical application—indicates the consideration that must have been given to the subject of electrical safety for all these varied conditions. The author of this book was until recently the Senior Electrical Inspector for the British Home Office and he writes with wide experience and clear judgment as to specific precautions that should be taken to prevent accidents. 292 pp. $15.00. Philosophical Library, Inc., 15 East 40th St., New York 16.

Guesswork has no place here. High temperature alloys that make up this missile's critical components must be right every time . . . with predictable performance built into each forging, fastener, and other component parts.

Vacuum melted alloys—new, predictable performing alloys made by Carpenter's exclusive VACUMELTROL and CONSUMET* processes—provide this dependability. And with it, component manufacturers report improved forgeability, better finishes, fewer rejections, faster production.*

Carpenter's many years' experience in producing these cleaner, more uniform and dependable vacuum melted alloys is your assurance of the best predictable performance at elevated temperatures . . . or at any temperature.

A call to your Carpenter representative will put this experience to work for you today. The Carpenter Steel Company, Reading, Pa.

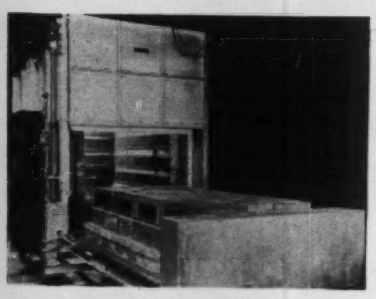
**Carpenter trademarks for alloys melted in vacuum induction and consumable electrode furnaces, respectively.*

a new company 70 years old

Carpenter steel

The Carpenter Steel Company, Main Office and Mills, Reading, Pa.
Alloy Tube Division, Union, N. J.
Webb Wire Division, New Brunswick, N. J.
Carpenter Steel of New England, Inc., Bridgeport, Conn.

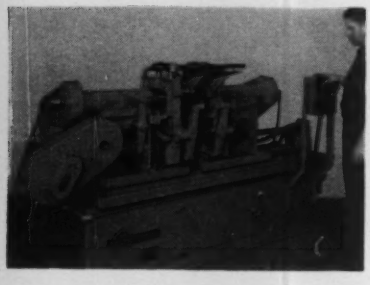
New Equipment and Machinery



Furnace Allows Only 3° Variation in Temperature

Designed to deliver uniform temperatures throughout, a car-bottom furnace has heating elements in the side walls, back wall, door, and under the hearth of the car. The elements are formed of 80-20 nickel alloy, and are connected to 440-v, 3-phase, 60-cycle current; the watts density on the ribbon is 10 watts per sq in. The furnace lining is 12-in. thick. The furnace is 48-in. wide, 32-in. high, and 96-in. long. The electric-heated furnace can heat large numbers of high-alloy castings. (Waltz Furnace Co.)

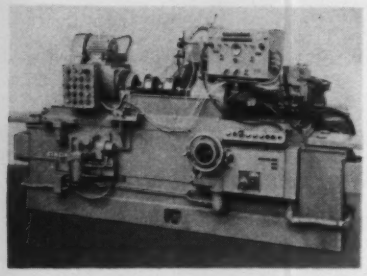
For more data circle No. 49 on postcard, p. 93



Machine Chamfers Tubing of Various Sizes

A high-production, double-end, deburring machine automatically chamfers the inside and outside diameters and face of tubular steel parts. Tubing from ¾- to 2¼-in. diam, and from 2½- to 24-in. long can be deburred by this machine at production rates up to 6000 pieces per hour. A variable-speed program shaft synchronizes all automatic operations. High-speed spindles, on which the deburring tools are mounted, are supported by ball bearings. The unit occupies floor space of 3 x 9 ft. (Acme Mfg. Co.)

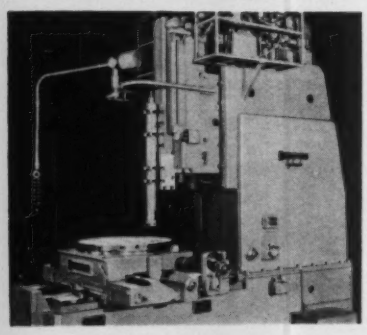
For more data circle No. 50 on postcard, p. 93



Grinder Rotates Work Smoothly for Quality Finish

Combining outside diameter and shoulder grinding in a single, fast, automatic cycle, a line of angular wheel-slide grinders is built in two sizes. They are: 6-in. radius and 10-in. length and 10-in. radius and 14-in. length sizes. Typical applications include: crankshafts; steering knuckles; gear blanks with hubs; and stepped shafts with critical flanges, tapers, and shoulders. The machines are available with both 30° and 45° wheel feed. (The Cincinnati Milling Machine Co., Grinding Machine Div.)

For more data circle No. 51 on postcard, p. 93

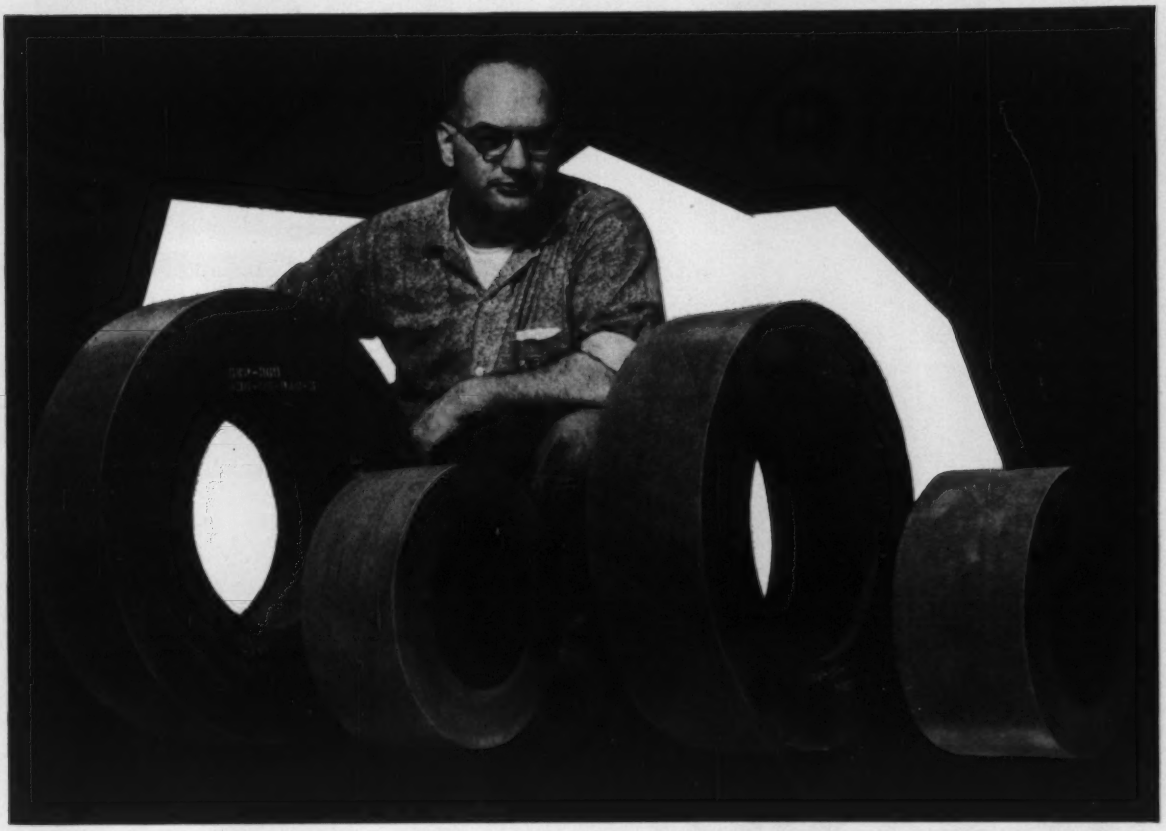


Slotter Offers Savings in Set-Up Time

Operated by pushbutton control, a metal-cutting slotter has a built-in dividing head. This head provides power indexing when cutting keyways, serrations, and gear teeth. The 36-in. stroke, vertical slotter greatly increases production application on all kinds of slotter work, because the ram can travel in any angular plane. No levers are required for the engagement of any feed or traverse movement. Two-speed traverse is available, enabling the operator to reposition the stroke; lengthen or shorten it directly from the pendant control, without levers, cranks, or stopping the machine. (Rockford Machine Tool Co.)

For more data circle No. 52 on postcard, p. 93

VULCANITE CENTERLESS WORK AND REGULATING WHEELS



PRECISION MATES!

Centerless grinding is the highest in the art of metal finishing. Unless the work wheel and the regulating wheel have been made for each other, a *needless* handicap occurs. U.S. Rubber centerless wheels are precision-mated. The production of perfect mates for centerless grinding is a U.S. Rubber specialty.

"U.S." Vulcanite was the first rubber-bonded wheel made for industrial America. 100 years of production and research back up our present *precision mates*. The hundreds of plants that use "U.S." Vulcanite *precision-mated* wheels prove the point that to do otherwise imposes a needless handicap.

The "U.S." Grinding Wheel sales engineer will save dollars for you in your grinding operations. We will welcome a call from you at U.S. Rubber, Grinding Wheel Dept., 10 Eagle Street, Providence, R. I., or the address below.

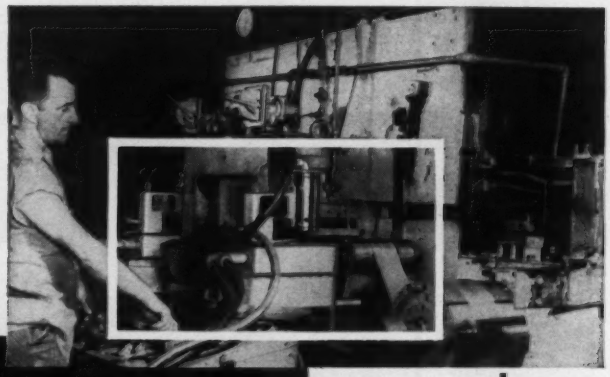
Mechanical Goods Division

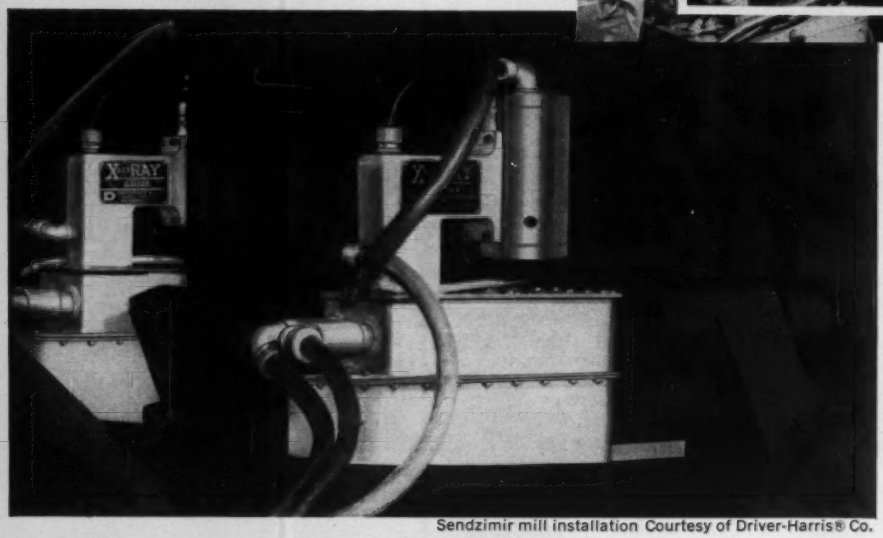
United States Rubber

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

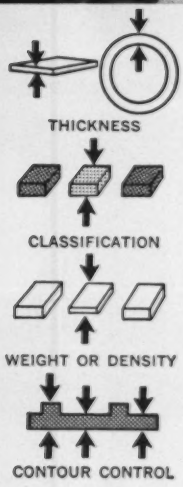
Rockefeller Center, New York 20, N.Y. In Canada: Dominion Rubber Company, Ltd.

keep an x-ray "eye" on your metal-rolling costs . . .





Sendzimir mill installation Courtesy of Driver-Harris® Co.



XACTRAY NON-CONTACT THICKNESS GAUGES

BOOST YEAR-ROUND PROFITS WITH SPEED AND PRECISION

XactRAY gauges have long been noted for their accuracy in providing absolute thickness measurement of metal on-the-fly. Now they're winning recognition for another great operating characteristic as well—economy—and more and more metal men are discovering why!

Compact and efficient, these gauges require little attention, either for operation or maintenance. And they can be installed practically anywhere in the mill, even close to hot equipment, without upsetting the process line. Mountings are custom built to fit particular requirements.

Continuous XactRAY gauging, coupled with automatic controls and/or alarm devices, saves manhours and millhours...gives measurements to tolerances as close as ±.000010" whether the metal is moving at 6 or 6,000 feet per minute. Material can be put "on-gauge" in fractions of seconds, and the response to thickness deviations is faster than with most other non-contact gauges. This leads to further savings through reduced scrap.

Whatever your measurement...foil, plate or sheet ...ferrous or non-ferrous metals and alloys...you'll find XactRAY can contribute to your own dollar savings. Further economies can be effected through the addition of XactRAYMATIC controls.

Write for the latest literature giving full information on the cost-cutting advantages of XactRAY gauges. It's yours for the asking through your local Weston representative...or write to Weston Instruments Division, Daystrom, Inc., Newark 12, N. J. *In Canada: Daystrom, Ltd., 840 Caledonia Rd., Toronto 19, Ont. Export: Daystrom's International Sales Division, 100 Empire St., Newark 12, N. J.*

DAYSTROM, INCORPORATED
WESTON INSTRUMENTS DIVISION
World leader in measurement and control

HOW TO COPE WITH A COUPLER

At National Malleable & Steel Castings Co., Acme Idea Man Gene Fairbank views Idea No. U6-36 which he helped develop.

These AAR Standard E-60 couplers used to be a king-size shipping problem. Previously, they were loaded singly, by overhead crane, in gondola cars—unloaded painstakingly the same way.

Now, with Acme Steel Strapping, couplers are palletized in lots of six. Loading and unloading are faster, and easier. Storage is simpler, requires less space. Inventory problems have been eased.

There's a good chance that Acme Steel Strapping can profitably solve a materials handling challenge for you. Let your experienced Acme Idea Man study your problem. Or, for more facts, mail the coupon.

ACME STEEL

IDEA LEADER IN

STRAPPING

ACME STEEL COMPANY
Acme Steel Products Division
Dept. IFS-50
135th St. & Perry Ave.,
Chicago 27, Ill.

Please send me Idea No. U6-36 and examples of how major companies in my field use Acme Steel Strapping.

*Name*_____

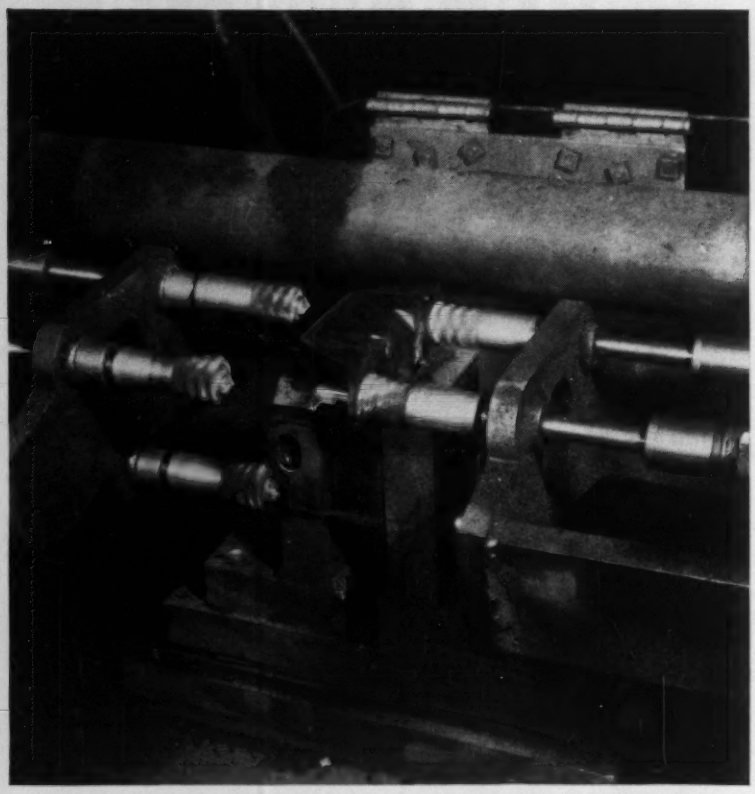
*Title*_____

*Firm*_____

*Address*_____

*City*_____ *Zone*_____ *State*_____

FACING... *another problem*



SPOT FACING operation at Monarch Rubber Company, Hartville, Ohio. These Osborn End Brushes—in combination with drills—are horizontally mounted in two drill clusters. They clean surplus rubber from bolt holes and face the area around bolt holes on both sides of this rubber-bonded-to-steel motor mount. Rate: 750 pieces per hour.

SOLVED *with Osborn power brushing*

Facing off surplus rubber inside and around the bolt holes of this shock-absorbing, rubber-bonded-to-steel motor mount used to be a production bottleneck for this manufacturer.

Now an efficient combination setup of drills and Osborn Power Brushes replaces a former slow, costly drill press operation. Production is up to 6,000 pieces per 8-hour shift with brush life running 18,000 to 20,000 parts.

Your own troublesome metal finishing problems of every description—deburring, cleaning, polishing, precision blending—can be eliminated with advanced Osborn power brushing methods. An **O**sborn **B**rushing **A**nalysis—made in your plant now at no cost or obligation—is the first step toward smoother, less costly production. Write for details. *The Osborn Manufacturing Company, Dept. F-96, Cleveland 14, Ohio.*

Osborn Brushes

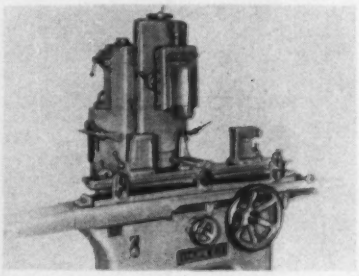
OSBORN

Metal Finishing Machines . . . and Finishing Methods
Power, Paint and Maintenance Brushes
Foundry Production Machinery

NEW EQUIPMENT

Versatile Grinder

A versatile cutter and reamer grinder, this machine is well suited for grinding primary and secondary clearances on milling cutters, end mills, reamers, metal-slitting saws and counterbores. Teeth on cylin-



drical-ground tools may be cleared on the grinder to provide a predetermined cylindrical margin. (Hartex Div., Union Twist Drill Co.)

For more data circle No. 53 on postcard, p. 93

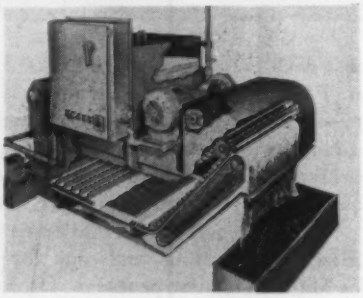
Thermal Wells

High-pressure thermal wells can handle pressures up to 3000 psi at 600°F, or 2000 psi at 700°F. The wells come in three styles: coupling head, hex head, and with a moisture-sealed, tamper-proof cover. All are stainless steel with heliarc welded junctions. (Fenwal Inc.)

For more data circle No. 54 on postcard, p. 93

Automatic Filtration

Completely automatic, a filter unit operates with pressure and vacuum on the media, and at the lowest possible liquid-inlet height.



This was accomplished by designing a filter where the media travels on the bottom of a settling tank and above a vacuum box. Dirty coolant, returning from the machines, enters

From school room to tool room an investment in Hevi-Duty Furnaces pays triple dividends

Your first dividend comes when you call a Hevi-Duty Sales Engineer. He is far more than a "nuts and bolts" salesman. He is qualified to lay out the most efficient over-all heat processing system for you. His services are yours for the asking.

Your second dividend comes with units that fit your system *exactly*. Better yet, they may well be standard designs for they come from the most complete line of electric and fuel-fired furnaces and ovens available.

Your third dividend is rugged, heavy-industrial quality. No one would say Hevi-Duty furnaces will *never* wear out, but hundreds of old-time users are still wondering *when*.

Why not call a Hevi-Duty Sales Engineer to discuss your heat-processing problems? These users did. Now they are enjoying the dividends.

HEVI-DUTY

Electric and Fuel-Fired Industrial Furnaces and Ovens

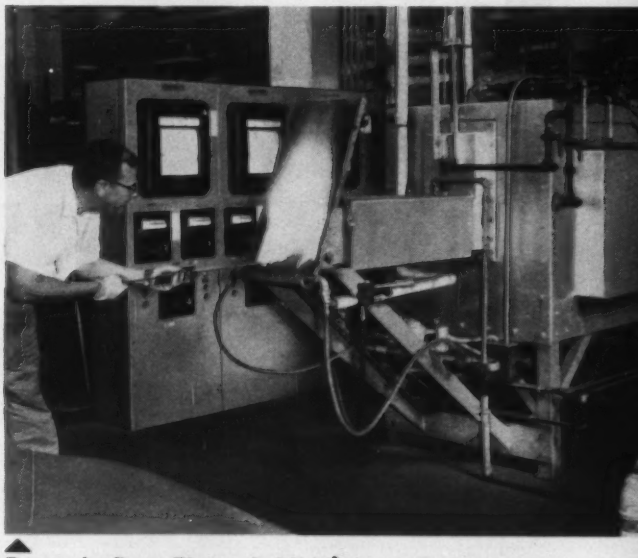
B P C

A Division of Basic Products Corporation

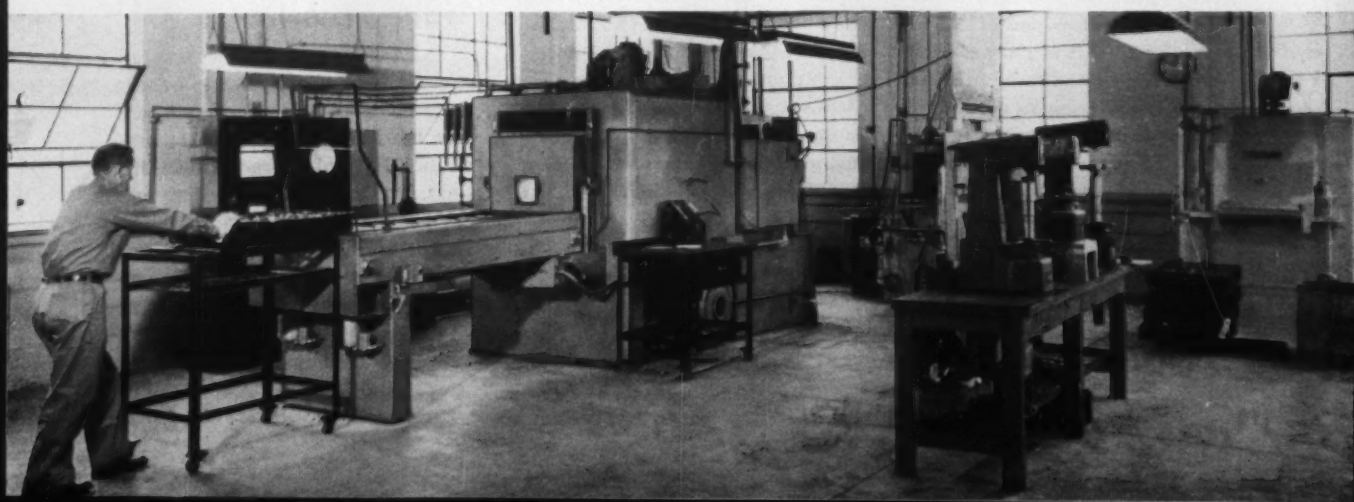
Hevi-Duty Electric Company, Milwaukee 1, Wis.

▲ Adult education classes in a Wisconsin high school use this Hevi-Duty 051-PT muffle furnace for copper enameling. In constant use for 12 years, it still has all four original heating units. Clean, safe, and easy to operate, this furnace provides uniform chamber heat with negligible heat loss despite frequent door openings. ***For complete information on this muffle furnace, write for Bulletin 849.***

Bedford Gear and Machine Products Co., Bedford, Ohio, eliminated $1,000 per month in scrap losses with this Hevi-Duty Clean-Line automatic heat-treat unit. This heat-treating system includes enclosed quench furnace, washer, atmosphere draw furnace, and endothermic generator. ***For more information, please send for Bulletin D-100.*** ▼

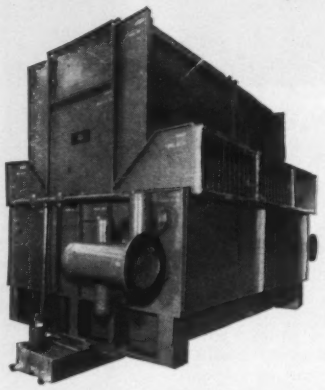


▲ Burroughs Corp., Plymouth, Michigan, reports no scale, no oxidation, and no distortion on high-speed tools and dies hardened in this Hevi-Duty high-temperature furnace. It has two zones of control, a water-jacketed cooling chamber, and maintains uniform temperatures up to 2300°F. ***For more complete information, please send for Bulletin 653.***



Useful
Unusual
Unique
LARGE FASTENERS
1¾" BOLT DIAMETER AND LARGER
FORGED NUTS
BOLTS · THREADED
RODS · TURNBUCKLES
· CLEVISES
EYE BARS · LOOP
RODS · COUPLING
NUTS · SLEEVE NUTS
· SPECIALS
FREE DATA ON LARGE FASTENERS
Describes all types of large fasteners for heavy machinery, power plants, bridges, ships, dams, docks, atomic plants, foundations. Write for Bulletin 160, Joseph Dyson & Sons, Inc., 5125 St. Clair Ave., Cleveland 3, Ohio, Phone HE 1-6157.
DYSON
NOTHING'S TOO BIG FOR A DYSON LARGE FASTENER!

ECONOMICAL COOLING OF GASES AND COMPRESSED AIR



Cooling gases or cooling and removing moisture from compressed air, the Niagara *Aero* After Cooler offers the most economical and trustworthy method. Cooling by evaporation in a closed system, it brings the gas or compressed air to a point below the ambient temperature, effectively preventing further condensation of moisture in the air lines. It is a self-contained system, independent of any large cooling water supply, solving the problems of water supply and disposal.

Cooling-water savings and power-cost savings in operation return your equipment costs in less than two years. New sectional design reduces the first cost, saves you much money in freight, installation labor and upkeep. Niagara *Aero* After Cooler systems have proven most successful in large plant power and process installations and in air and gas liquefaction applications.

Write for Descriptive Bulletin 130.

NIAGARA BLOWER COMPANY

Dept. IA-5, 405 Lexington Ave., New York 17, N. Y.

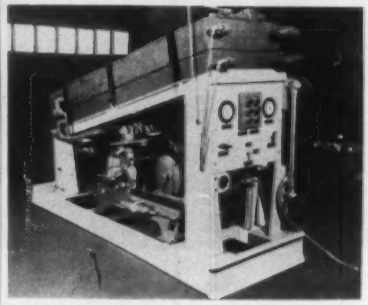
Niagara District Engineers in Principal Cities of U. S. and Canada

the filter about 18 in. above the floor. The dirt-laden liquid passes downward to the filter media where all contaminants are removed. Dirt remains on the media, and the clean liquid passes to the suction of the filter pump. The coolant can then be pumped either directly to the machine or to a clean coolant reservoir. (Hydromation Filter Co.)

For more data circle No. 55 on postcard, p. 93

Mechanical Separator

Drying a maximum amount of moisture and oil from high-pressure air, nitrogen, and helium, a refrigerated mechanical separator handles these gases under pressures of 3500 to 12,000 psig. The separator lowers gas temperature to 35°F to reduce moisture and oil content by about 80 pct. By providing mechanical separation with direct discharge, dewpoints of –50° to –65°F can be maintained. Standard models of the separator can cool incoming air temperatures as high as 105° to 35°F. (Cardair Div. of Marmon-Herrington Co., Inc.)



For more data circle No. 56 on postcard, p. 93

Trolley Lubricator

Fully automatic, an air-powered trolley lubricator operates by remote controls from the floor level. The lubricator assures correct lubrication of hard-to-reach trolley fittings. The unit is self-adjusting and completely self-contained. The lubricator consists of left- and right-hand lubricating assembly, a 5-lb capacity, lubricant reservoir mounted on a 4-ft I-beam, and an electrically- or pneumatically-operated

Strong Restraining Influences...

Roebling Hose Reinforcing Wire

Roebling Hose Wire, Hose Reinforcing Wire and Hose Wrapping Wire bear the stamp of Roebling's strict attention to constant uniformity. As with all Roebling wire products, each is wholly Roebling-made and Roebling-controlled, from open hearth to packaging. Tensile strength and forming qualities, finish and gage are of an excellence that proves itself in use.

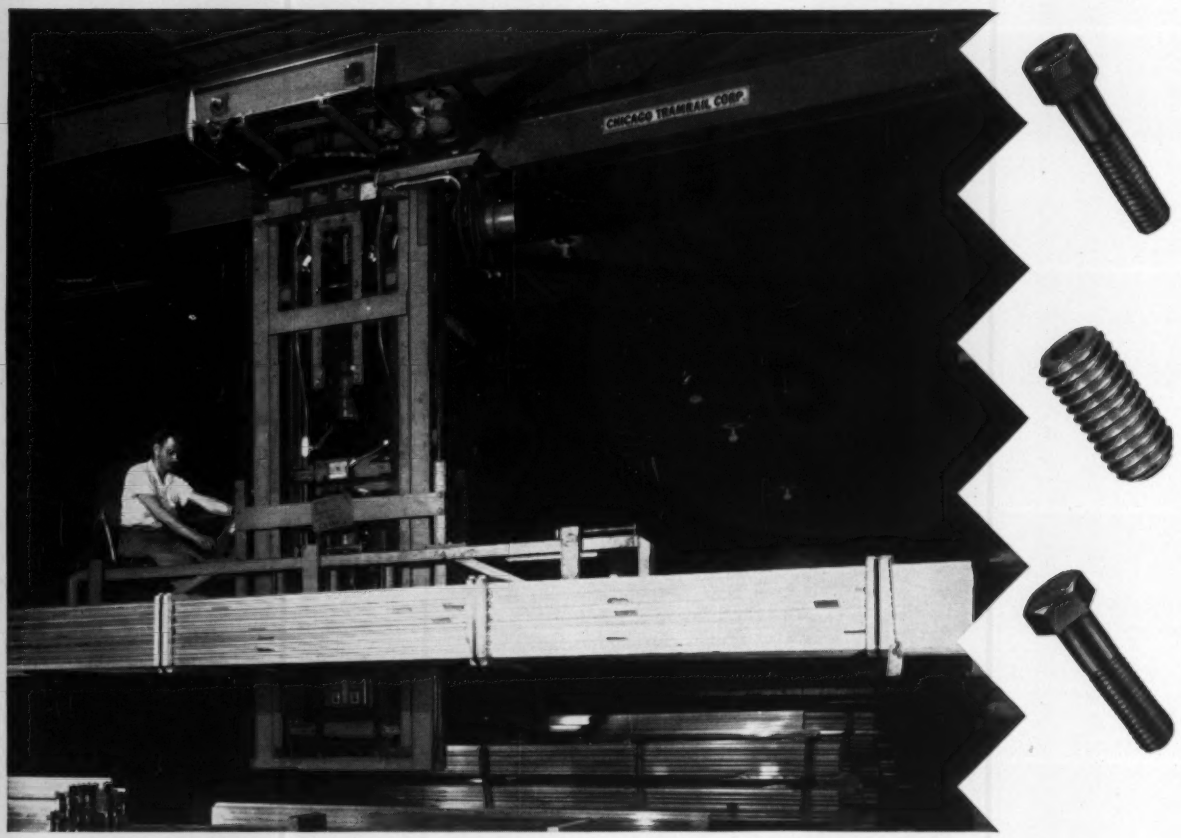
Resistance to internal and external pressures and wear are what you look for in hose wires and what you pay for. With Roebling, you *get* them.

For further information on these and other Roebling quality products, write or call Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey.

Roebling... Your Product is better for it

ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division
The Colorado Fuel and Iron Corporation



17 different Stanscrew fasteners used in Chicago Tramrail's Trak-Rak

"In constructing our complete line of cranes we make no compromise with the most rigid requirements of safety," says S. W. Fountain, Vice-President, Chicago Tramrail Corporation. "Therefore, reliability is our principle reason for standardizing on quality components such as Stanscrew fasteners."

"But Stanscrew gives us more than fast service and reliable products. Their broad line of over 5,000 fasteners offers a wide selection . . . and their fastener specialists and engineers are always ready to assist our design department in determining the strongest, safest, most economical fastener for every application. For example, in our Trak-Rak stacking crane above, 17 different Stanscrew fasteners are used . . . each selected after careful study for the precise job it has to fill."

Like Chicago Tramrail, many other industrial leaders have learned it pays to capitalize on Stanscrew's backlog of over 80 years of fastener experience. To use this accumulated knowledge in solving your particular fastener problem, just call your Stanscrew distributor. He will quickly arrange for a visit from your Stanscrew fastener specialist.

STANSCREW FASTENERS

CHICAGO | THE CHICAGO SCREW COMPANY, BELLWOOD, ILLINOIS
HMS | HARTFORD MACHINE SCREW COMPANY, HARTFORD, CONNECTICUT
WESTERN | THE WESTERN AUTOMATIC MACHINE SCREW COMPANY, ELYRIA, OHIO

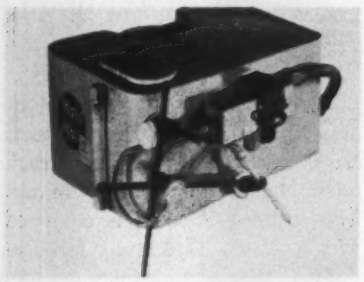
STANDARD SCREW COMPANY 2701 Washington Boulevard, Bellwood, Illinois

control panel. The lubricator delivers a predetermined, measured amount (up to 0.025 cu in.) of lubricant per shot. (Aro Equipment Corp.)

For more data circle No. 57 on postcard, p. 93

Mist Generator

Designed for use on drill presses having 2¾-in. columns, a mist-coolant generator features an automatic on-off control. Air and coolant are controlled automatically by the up and downward movement of the drill-press spindle. The attachment of the tank to the drill

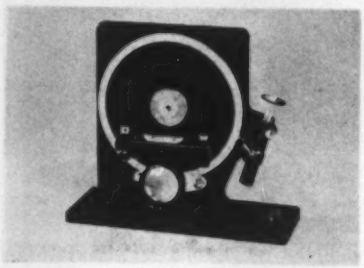


column further permits complete operator freedom. Needle valves permit precision air and coolant flow, set to meet job requirements. The unit allows regulated control of efficient mist cooling, for all drill-press operations. (Aetna Mfg. Co.)

For more data circle No. 58 on postcard, p. 93

Vertical Clinometer

Simple and inexpensive, a clinometer determines or pre-sets vertical angles up to 180°, either side of the vertical within accuracies of 1′ or 30″ of arc. The instrument con-



sists of a 4-in. vertical circle, graduated to either 30 or 20 minutes, and a vernier with an adjustable reading glass. A leveling bubble, sensitive to 60″, is securely

rapid
short flame combustion
...even on residual fuel oil

THERMAL
VORTEX BURNER

Here is a versatile unit that gives rapid, clean combustion on a wide range of fuels including Bunker C, No. 6, light oil, any gas... even liquid organic wastes.

Combustion is 80% completed within the burner itself and takes place with a whirling, short flame that attains heat release rates of over 1,000,000 BTU/hr per cu ft. Products of combustion are clean and sufficient excess air for tempering the products may be introduced through the burner itself without causing smoke or instability.

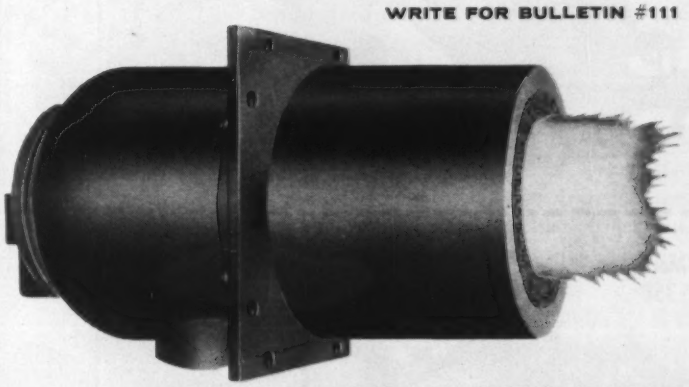
standard models available...

Complete units from 3,500,000 BTU/hr to 50,000,000 BTU/hr are available and may be fitted for steam, compressed air or mechanical atomization. With dual fuel arrangements switching from gas to oil is accomplished without shutdown.

instant ignition...

Gas-electric or torch ignition allows full ignition in a few seconds—even with a cold burner.

WRITE FOR BULLETIN #111



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Gas, Oil & Combination Gas-Oil Burners • Heat Exchangers • Air Heaters • Submerged Combustion • Gas Generators • Combustion & Heat Transfer Engineering

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REPRESENTATIVES IN PRINCIPAL CITIES

attached to the vertical circle. The unit is mounted on a solid base. The instrument is used for leveling, adjusting, or finding errors in machine or parts set ups. (Buff & Buff Mfg. Co.)

For more data circle No. 59 on postcard, p. 93

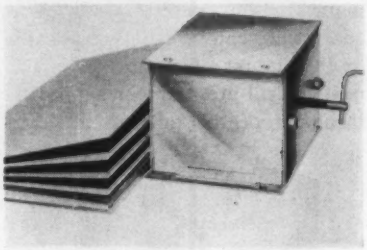
Feeding Machine

Featuring instant start and stops, an automatic feeding machine feeds uniform, pre-determined lengths of material to any secondary machine. It consists of a friction-type, roll-feed mechanism driven by a constantly-running, electric motor-driven flywheel. An adjustable length-measuring control can be pre-set to continuously and automatically produce any work length within the machine's range from 3 to 60 in. Micrometer control permits work length adjustments to 1/32-in. or less. Standard feed is 50 sfm. The machine can be used to feed flat material, coiled stock, or even round stock with specially-contoured rolls. (Benchmaster Mfg. Co.)

For more data circle No. 60 on postcard, p. 93

Sheet Separator

An adjustable, magnetic unit separates and floats stacked sheets of steel ranging in thickness from 32 to 7 gage. It is designed to facilitate the feeding of round, square or irregularly-shaped sheets into presses, shears and similar production equipment. With adjust-



able separators, stacked steel sheets are magnetized so they repel each other, and literally "float" in air. The adjustable model is equipped with a simple hand crank for precision setting. In addition to this unit, 18 other standard models are offered. (Multifinish Mfg. Co.)

For more data circle No. 61 on postcard, p. 93

Brushing Machine

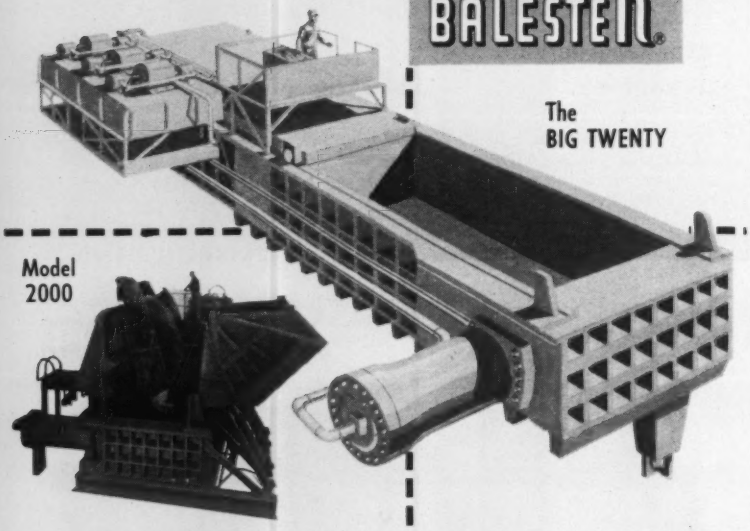
Designed to meet the needs of cleaning copper tubes and fittings, a copper-brushing machine cleans the inside diameter of fittings. It also deburrs and cleans the outside

diameter of tubing — by power. Capacity is ½-4 in. The oscillating-type spindles on the machine do a quick, efficient cleaning job, and at the same time it tends to conserve brush life. The tubing is rapidly

America's Most Complete Line of High-Speed Baling Presses

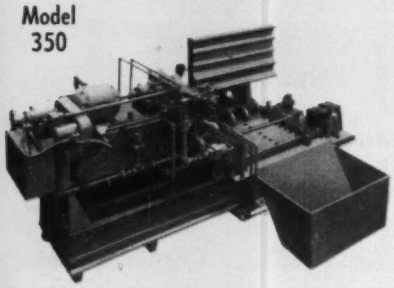
DEMPSTER BALESTER®

The BIG TWENTY

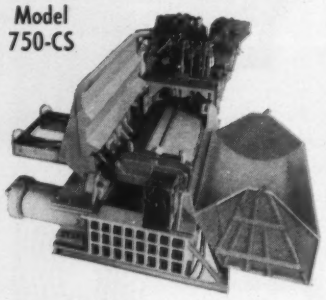


Model 2000

Model 350



Model 750-CS



Cut scrap-metal baling time and costs with a high-speed, low-investment DEMPSTER-BALESTER. You buy the power and capacity you need . . . plus dependability . . . when you choose from the many models in America's most complete line. Write for free catalog on the new 750-CS.

DEMPSTER BROTHERS Inc. KNOXVILLE 17, TENN. DEPT. IA-5.

DRILLING HIGH TEMPERATURE ALLOYS WITH THE "BUFFALO" RPMSTER

In 1953, this "Buffalo" RPMster was installed in General Electric Company Jet Engine Department's Metal Working Laboratory. Since that time it has operated for thousands of hours, drilling high temperature alloys such as A-286, U-500, Rene-41, M-252, L-605, X-40, chrom-alloy and many other difficult materials.

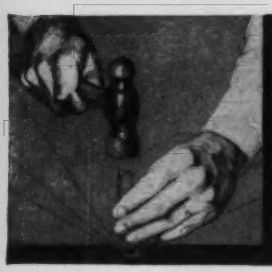
In conjunction with dynamometers to record drill thrust and torque, many drilling problems have been solved. The "Buffalo" RPMster was ideally suited to this job because of its instantly available range of speeds from 90 to 3000 RPM and rigid construction. While General Electric uses the drill for testing purposes, new improvements make the "Buffalo" RPMster even more desirable as a production or special application drilling machine. A new torque controlled power feed prevents damage to machine and tool being used and capacities up to 2" are now offered. Of special interest to companies drilling super-hard materials is the modified RPMster supplied with balanced hollow spindle, forced coolant system having a pump with a capacity to 100 psi, special splash guards and rubber-flex collet chuck. This machine is designed to operate with the new hollow core "cold point" drill, and diamond impregnated bits. "Buffalo" hollow spindle drills are available for speeds up to 10,000 RPM.

For further information on the "Buffalo" Variable Speed RPMster, contact your machine tool dealer or write direct for details.

BUFFALO FORGE COMPANY 492 BROADWAY • BUFFALO, N. Y.

CANADIAN BLOWER & FORGE CO., LTD., KITCHENER, ONTARIO

DRILLING • PUNCHING • SHEARING • BENDING



Specify PANNIER STEEL STAMPS for a longer life of CLEANCUT MARKING

29,335 hammer blows—and still marking cleanly—Pannier Letter and Number Stamps

Rounded corners for finger comfort
Rounded head distributes impact, reduces mushrooming.
Type size Identification
Added metal in Pannier fillet increases durability. Correct bevel gives clearer impression, longer life. Outside bevel longer than inside for protection of character face.

Made of the finest tool steel and correctly heat treated for best combination of hardness and toughness, Pannier single character stamps can take it! Scientific shaping and accurate engraving insure a long life of good, clear impressions. Available in letters, figures and special symbols, and in light, medium or heavy duty design.

Extra tough steel forging stamps for hot or cold, heavy duty marking

For stamping names, part or patent numbers, trade marks and similar markings, Pannier forging stamps are made in four styles:—Hand-style, fullered for wire handle and wood handle style with eye parallel or perpendicular to lettering. All are designed and heat treated for clear impressions and long service. All are covered by the Pannier Master Marker guarantee.

Supreme Holders with "Roto-Pin" for quick, easy number change

An easy, half-turn flip for Roto-Pin releases any or all of the steel type for fast change. A reverse flip locks them in perfect alignment.

Roto-Pin makes this Pannier Master Marker a time saver in number change and makes serial number marking fast and efficient. The hardened anvil at the base of the type slot keeps type in perfect alignment for equal impression. Machined from bar tool stock, the Supreme Holder has a heat treated striking head. Both anvil and striking head are replaceable for longer life of the holder itself. Made in hand or wood handle styles, for hot or cold marking.

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cleaned by a continuously-rotating steel brush. Directly behind the tube brush, on the same shaft, is a rotating file for quick deburring of the end of the tubing. The machine is 16-in high, 18¾-in. wide and 13½-in. long. (The Oster Mfg. Co.)

For more data circle No. 62 on postcard, p. 93

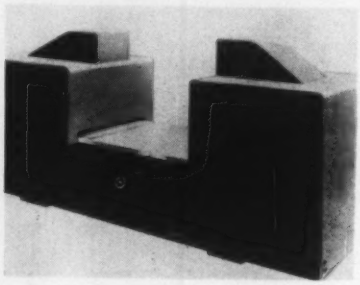
Splice Welder

Permitting a high number of welds per second, a splice welder was designed and developed for high-speed precision splicing of structurally-critical honeycomb core materials. It can average 12 to 15 welds per second. The unit consists entirely of transistors and other solid-state devices. Solenoid-valve life is estimated at over 10 million operations. Each weld is a separate operation. The basic unit, contained in a 22- x 12- x 15-in. portable cabinet, operates on standard electrical and compressed-air outlets. Electrical requirements are: 230 v, 60-cycle single phase, with a source capable of supplying peak currents of 50 amp and an average current of 15 amp. (Hexcel Products, Inc.)

For more data circle No. 63 on postcard, p. 93

Vibration Table

For environmental testing, an electromechanical vibration table consists of a single unit in which the table is directly mounted between two shaker heads. Among its advantages are: the elimination of



power losses that occur when coupling equipment is necessary; its adaptability to testing in both the horizontal and vertical planes. The table develops 3000 lb of force through push-pull operation of its

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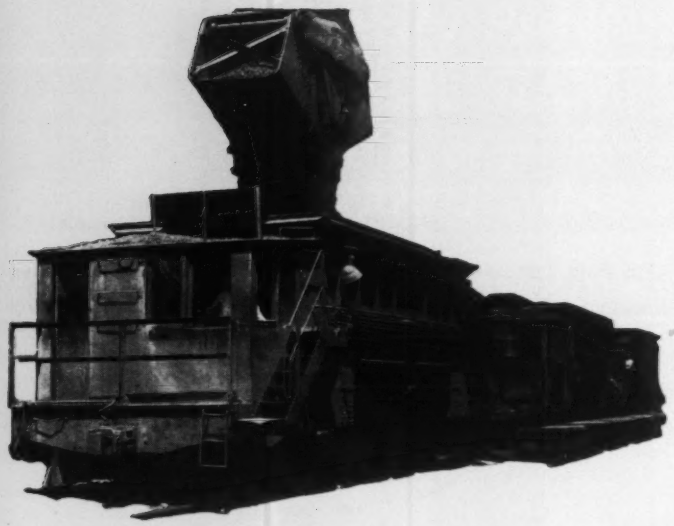

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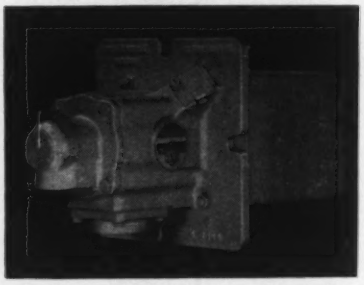
NEW EQUIPMENT

two shaker heads. This permits an equally-distributed first vibration. Weighing 5000 lb, the vibration table is 33½-in. high, 78-in. long, and 29-in. wide. (Westinghouse Electric Corp.)

For more data circle No. 64 on postcard, p. 93

Gas Burner

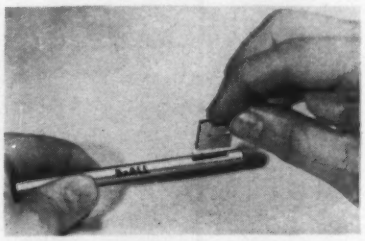
Using excess air with a new series of nozzle-mix-gas burners provides uniform furnace temperature for heat-treating processes, regardless of uneven loading. This uniform temperature is the result of lowering gas intake while maintaining an excess air rate. Simplified design, combining a rugged cast-iron mounting plate and burner body into one piece, with 9-in. burned ceramic tile attached, provides solid construction. (The North American Mfg. Co.)



For more data circle No. 65 on postcard, p. 93

Counterbores

New type counterbores have replaceable, high-speed steel blades. The blades are also interchangeable so that blades of the same thickness may be used with different shanks and pilots. Due to this feature, it is possible to make more than 30 different combinations of sizes with the blade set. The blades are recommended for tool-room or light production work. (The DoAll Co.)



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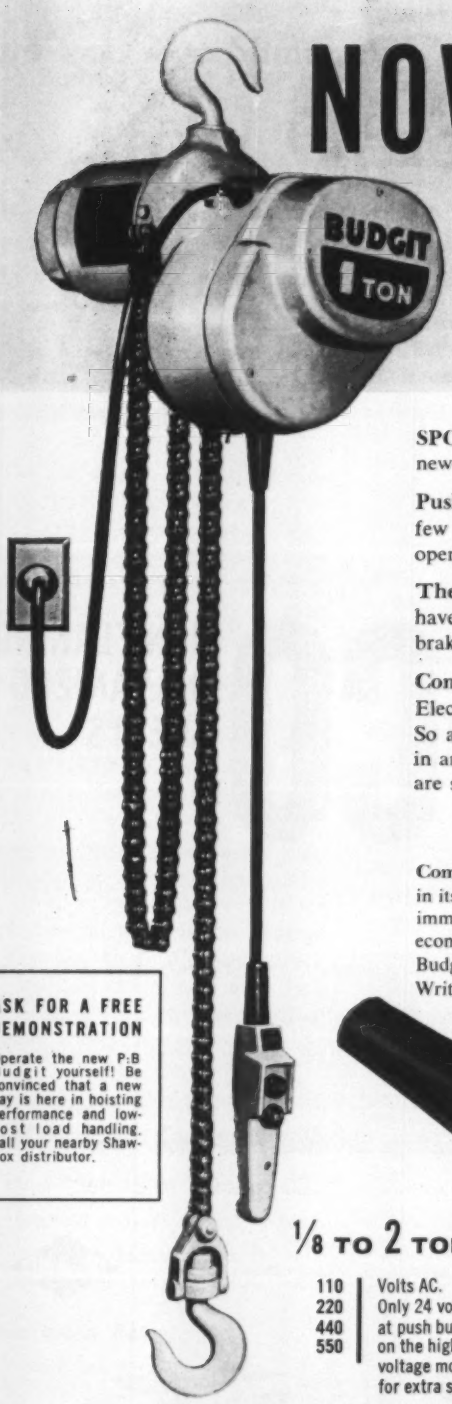

SPOTTING speed and accuracy are "right on the button" with this new Push Button Budgit Electric Hoist.

Push button action is so sensitive you can spot loads precisely in a few ticks of time. The control station fits the palm for one-hand operation, leaving the other hand free to guide the load.

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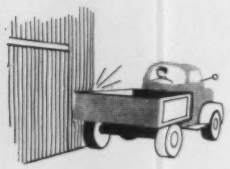
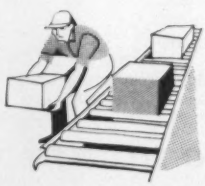
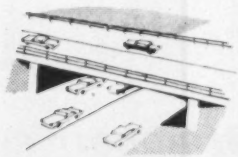


Farm buildings made from non-flaking TI-CO maintain corrosion-resisting coating under toughest abuse.



Though subjected to constant abrasive action, TI-CO adds years of service to this roller conveyor.



Denting, scratching, weathering won't stop the protection of highway guard rails afforded by TI-CO.

The Iron Age Summary

Steel Orders Continue to Lag

In spite of some scattered improvements in orders, the rate of incoming business does not justify any optimism.

Best news is some new business from the auto industry and seasonal factors in construction.

■ The rate of new steel orders continues to be disappointing.

Scattered pickups in new orders and new buying by automakers have injected some regional optimism, but the overall rate of new business is well below current shipments.

Operating Rate Sinks — This means that the operating rate of the steel industry will drop off sharply through the remainder of the second quarter and through most of the third.

Operations for the second quarter will average, at best, possibly 75 pct of capacity. A rate of 70 pct is likely in the third. But an average of 70 pct in the third quarter means that the operating rate will drop well below that point before turning upward.

Orders Lag—The ratio of new orders to consumption is still not in balance. For some major mills, the rate of incoming orders for May is less than 50 pct of capacity. Mills are living on their backlogs, rather than new business.

Some cheerful notes are scattered in the generally gloomy reports. Automakers have restored some of their cuts in May and June tonnage. Good sales reports may mean a higher production of 1960 models.

Seasonal factors are now reflected in some upturn in steel used in construction.

Spending Holds Up—In spite of the overall gloomy market picture, the steel industry is going ahead with its capital spending plans for 1960. Most of the spending is for new equipment to increase efficiency, cut costs, and improve products.

Price softness continues, particularly in products affected directly or indirectly by imports. Wire producers have lowered prices on welded wire fabric and baling wire. However, imports are still selling below the domestic prices.

Conversely, substantial orders for sheet have been placed at Midwest mills for export through the St. Lawrence Seaway. Most of it is for wide sheet going to Great Britain for automobile production.

Price Outlook — On basic steel products, the pressures to hold the line on prices are getting stronger. In issuing quarterly reports last week, steel leaders acknowledged the competitive pressures from other materials and imports, as well as competition within the industry.

While The IRON AGE never conceded that price increases in December were a foregone conclusion, most in the industry did. It is apparent now that price increases under current market conditions are becoming questionable, if not actually doubtful.

Competition Tightens — Under current market conditions, performance of individual mills will vary. Service, products, customer relationships all will play a big part in getting business.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,132	2,210	2,417	2,604
Ingot Index				
(1947-1949=100)	132.7	137.6	150.5	162.1
Operating Rates				
North East Coast	78.0	81.0*	86.0	93.0
Buffalo	74.0	80.0*	91.0	100.0
Pittsburgh	78.0	78.0*	81.0	92.0
Youngstown	53.0	56.0*	74.0	85.0
Cleveland	77.0	73.0*	93.0	96.0
Detroit	94.0	100.0*	90.0	95.0
Chicago	75.0	83.0*	92.0	90.0
Cincinnati	83.0	82.0*	102.0	87.0
St. Louis	90.0	85.0*	103.0	106.0
South	78.0	79.0	80.0	92.0
West	72.0	72.0*	71.0	92.0
U. S. Rate	74.8	77.6	84.5	92.0

*Revised
Source: American Iron And Steel Institute

Prices At a Glance

(Cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.41	$66.41	$66.41	$66.41
Scrap No. 1 hvy (Gross ton)	$33.17	$33.50	$33.17	$33.83
No. 2 bundles	$23.17	$23.17	$22.50	$22.83
Nonferrous				
Aluminum ingot	28.10	28.10	28.10	26.80
Copper, electrolytic	33.00	33.00	33.00	31.50
Lead, St. Louis	11.80	11.80	11.80	11.30
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	99.25	99.25	99.625	102.625
Zinc, E. St. Louis	13.00	13.00	13.00	11.00

Gear Sales Advancing Steadily

Gearmakers' sales have advanced steadily during the past five months and are expected to retain these gains.

Heavy industrial and missile gears are leading the sales field.

▪ Gears have always been a bellwether industry. Gear industry sales advanced steadily during the November-February period. March returns are not complete, but there is some indication that the industry will show mild March advances. Here's what's happening:

Strong Sales—Demand for heavy, industrial quality gears of the type used in much capital equipment, has shown a strong March sales level. Part of the March gain has been sustained by unexpectedly high demand from the construction equipment and agricultural machinery industries. And there has been considerably higher demand from steel mill equipment makers than had been expected by most gear makers.

The net effect could be that March total gear production will again show advances, even though demand for lighter gears and aircraft quality gear trains hasn't been strong during the month of March.

Up and Down—Gear prices have firmed considerably, but there is reason to believe that there will be at least a few more price reductions during the next 30 days. Demand, if it continues to show gains, will keep these reductions at a minimum. And if April sales repeat the strength scored during the month of March, prices will firm up.

It may even be the case that late April and the May-June period, will see some price advances. This is the period in which some labor contracts will be written that will boost labor costs.

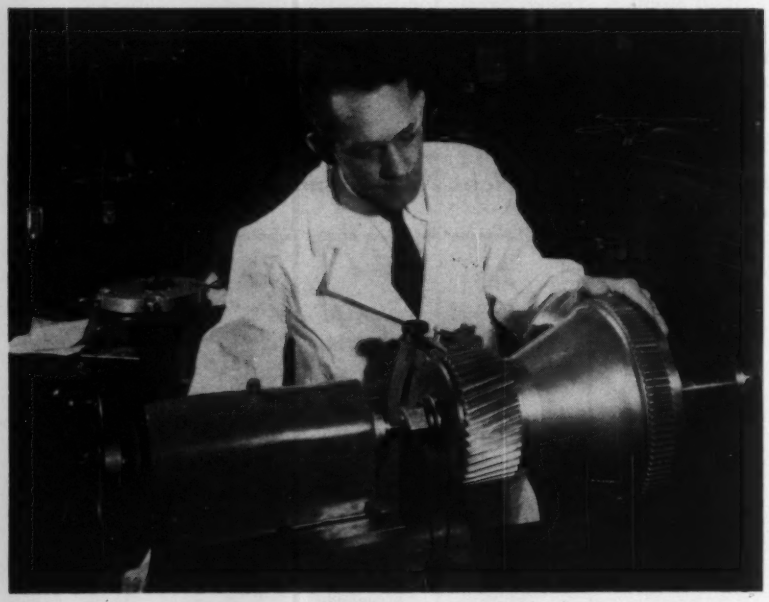
Heavy Gears Good—Light, aircraft-quality gears are off slightly at the moment, producers indicate. Missile gears have shown better March sales records, but military buying during the month of March wasn't as strong as had been expected.

Generally, gearmakers report that heavy gears are strongest, light gears are still weak. Overall gear backlogs have crept up to a general range of 30 to 90 days. Buyers are demanding rush-rush delivery, and are sometimes able to get it. But buyers should count on an average 4 to 6 weeks delivery.

More Gains—Another industry that reports gains in the drive field: Hydraulic couplings. This industry appears to be moving up on the strength of batches of new orders coming in from the construction equipment industry. There is no clear-cut upward surge, but some producers report definite gains over the past 30 day period.

There is some feeling among producers that the mechanical drive industry is turning a corner in 1960. Said one, "It's a little bit like 1958. We were running slow through all of first quarter. But once we got through March, the whole market seemed to pick up. I've been pretty pessimistic. But I've begun to change my mind over the past two weeks. I think the outlook is taking a turn for the better."

Most drive men are more cautious. But they are also more optimistic. To the purchasing agent, it's a hint that he might do well to place his orders a little earlier than he'd originally planned.



INSPECTION: A Foote Brothers Gear and Machine Corp. engineer inspects a new gear for dimensional accuracies and quality control.

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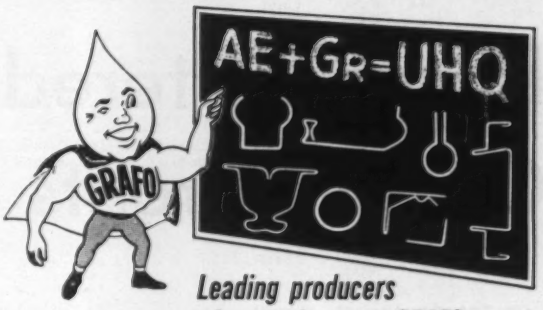

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Prices Battered On Two Fronts

In the Southeast, warehouses are trimming prices on hot-rolled products.

Price weakness is noted in wire products with reports of cuts in both baling wire and welded fabric.

▪ Competitive market conditions have led to new price cuts in two different areas. In the Southeast, steel service centers have lowered prices on hot-rolled products. Wire products showed weakness on both a national and local basis.

At least two Birmingham warehouses reduced prices for hot-rolled steel products an estimated average of $10 a ton. Some items are being cut as much as $16 a ton.

Baling Wire—Other Birmingham warehouses are expected to match the cuts of the leaders. And it is considered possible that the reductions will spread to adjoining districts.

Competition from lower priced imported steel has been given as the key factor in the price cuts.

A large producer is said to have chopped prices for baling wire by 5 pct. Presumably, the reduction has been applied nationally. Coils now sell at about $9.54 per cwt. Imports sell at about $9.25 per cwt. Other producers are expected to meet the new price.

Price Competition—In price adjustments of a more local nature, a major producer is pricing welded wire fabric to meet foreign competition at ports of entry.

The adjustment comes at a time when there generally is a seasonal increase in demand for welded wire fabric. The product is widely used for reinforcing in road building and building construction.

This product sells for $170 to $180 per ton. However, the import price is still said to be about $10 to $20 a ton under the lowest U. S. prices.

Sheet and Strip — Orders for June are coming in a little better. For the most part, this is due to the automakers who are increasing June auto production schedules.

East Coast producers say automotive buyers have restored some of the previous cuts in their May and June tonnages. However, they report some easing in demand for galvanized products.

Mills in **Cleveland** are being pushed for delivery in three weeks on cold-rolled sheet. Hot-rolled sheet is very loose and it is estimated that May production will only equal about 50 pct of capacity. However, galvanized sheet is showing strength as it enters a delayed seasonal upturn.

Steel sales offices in **Detroit** aren't overly optimistic about the auto industry's larger June orders. They point out that automakers are just restoring schedules that had been cut. And one notes that whenever automakers alter schedules, "they always over-do it."

Structural and Plate—Mills on the **East Coast** say they'll "limp" through May. And they aren't willing to make predictions beyond this month.

The market is showing some improvement in **Chicago,** but it still isn't strong. Structural products are now in the fourth week of a slow rise. But one mill will shut down for two weeks. This isn't expected to upset the local supply situation unless demand rises substantially faster than it has thus far.

Pipe and Tubing — A modest pickup is reported for standard pipe by one mill in the **Pittsburgh** district. Another mill says it is getting a few more orders for oil country seamless. This mill looks for a gradual improvement in oil country demand. However, this view isn't shared by most pipe producers.

Tinplate—Shipping releases have picked up in the past two weeks, according to a producer in **Pittsburgh.** This was the first admission that there was a lag in tinplate. However, there apparently was a slowdown in shipments. But tinplate producers say "releases are the only important thing." Comparatively slow sales of cans in recent weeks is blamed for the tinplate dip.

Bars—Order intake for May is very slow, especially from forgers doing business with the auto industry, according to reports from **Cleveland.** And prospects for June are even worse. Orders are being placed on a "best delivery" basis.

Cold-drawn bars are increasingly easy to get in **Chicago,** and it is expected that lead times will shorten through the rest of May and June. Meanwhile, mills are trying to convince customers that now is a good time to boost stocks of off-sizes. They point out that some stretch-out in deliveries can be expected in the third quarter.

PURCHASING AGENT'S CHECKLIST

For accurate forecasting, economic data must be seasonally adjusted, expert says. P. 36

Plastics makers push basic research in effort to create more sales. P. 40

Greater export sales improve machine tool orders. P. 57

(Effective May 3, 1960)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	May 3 1960	Apr. 26 1960	Apr. 5 1960	May 5 1959
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled trip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	13.55
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchants bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	45.00
Wrought iron bars	14.90	14.90	14.90	14.90
Wires: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	May 3 1960	Apr. 26 1960	Apr. 5 1960	May 5 1959
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.57
Foundry, Southern Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb‡	11.00	11.00	11.00	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$34.50	$34.50	$34.50	$35.50
No. 1 steel, Phila. area	34.50	34.50	34.50	33.50
No. 1 steel, Chicago	30.50*	31.50	30.50	32.50
No. 1 bundles, Detroit	30.50	30.50	30.50	29.50
Low phos., Youngstown	36.50	36.50	38.50	38.50
No. 1 mach'y cast, Pittsburgh	50.50	50.50	52.50	49.50
No. 1 mach'y cast, Phila.	51.50	51.50	51.50	49.50
No. 1 mach'y cast, Chicago	51.50*	52.50	52.50	52.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$33.17*	$33.50	$33.17	$33.83
No. 2 bundles	23.17	23.17	22.50	22.83
Coke: Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	$14.75-15.50	$14.75-15.50	$14.50-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	33.00	33.00	33.00	31.50
Copper, Lake, Conn.	33.00	33.00	33.00	31.50
Tin, Straits, N. Y.	99.25*	99.25	99.625	102.625
Zinc, East St. Louis	13.00	13.00	13.00	11.00
Lead, St. Louis	11.80	11.80	11.80	11.30
Aluminum, virgin ingot	28.10	28.10	28.10	26.80
Nickel, electroiytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composites

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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* Appears in April 28-May 12 issue.

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Dealers Still Wait For Mill Buying

The prolonged drought in mill orders is getting on dealers' nerves.

More than a lower operating rate is working against them.

■ Dealers are wondering if steel mills have gone out of business. From the lack of orders even the national operating rate of about 75 looks high to them.

"I can sum up the domestic market in one word—nothing," says an East Coast dealer. The prolonged lack of mill buying is getting on dealers' nerves.

What's the Reason?—They realize steel sales are off and mill output dropping, but even this doesn't fully explain the dead market. Other factors are mentioned: Large mill inventories, the swing to hot metal, more efficient steelmaking, and greater use of home and industrial scrap.

Only in one sales area—export—are the dealers encouraged. Overseas sales are strong and will remain that way for a while. In the absence of a domestic market, dealers far inland are shipping scrap to the docks.

Industrial scrap offerings for May are down $1 or more from April prices. Tonnages are also lower.

Pittsburgh—Prices of most grades are settling in a narrow range close to bottom. A local mill bought No. 2 heavy melting at $29. The same buyer took No. 2 bundles for $26 and $28, this was up from previous buys. This indicates there is competition for bundles. Dealers are being paid $28 for shipment to a nearby district.

Chicago — No. 1 steelmaking grades and cast grades slipped off $1 in a very thin market. Scrap is becoming increasingly hard to get. One major mill bought several grades at lower prices. But quantities shipped on district orders are not large. Dealers appear to be sitting tight on their present supplies. Yards are trying to boost inventories of turnings and steelmaking grades, expecting price gains in the next eight weeks. Electric furnace activity has improved slightly.

Philadelphia — Domestic market remains quiet. Export is still brisk. Local mills are doing practically no buying. Cast grades are moving at a fair pace to foundries. Brokers predict that export business should stay strong through May. One large exporter says April and May tonnages may set new records for the area. Yard collections are "steady to poor," according to a dealer. Export orders are attracting tonnages from far inland. Some shipments are coming into the area from points as distant as Harrisburg and Wilkes-Barre.

New York—Steelmaking grades are attracting little interest from domestic markets. Export is still firm enough to lend stability to prices. This is the basic complexion of the market which hasn't changed in two months. While prices are generally unchanged, some uneasiness is starting to creep into the market.

Detroit—Industrial list prices for May fell an average of $1 to $1.25 a ton. Turnings and cast grades weakened the most, dropping as much as $2. For the most part, however, the declines have not yet been reflected in dealer prices. Tonnage offered for May by one large automaker was 70 cars below the April amount.

Cleveland—There are no new local orders and mill interest is confined to industrial grades. The market is quiet and weak. Automotive bundles went for $1 to $1.50 under last month. In the Valley, one mill bought a special industrial grade for $37, down $1 from the last price by the same mill.

St. Louis—Dealer resistance is mounting in this area. But mill inventories are still large and scrap is abundant. Out-of-the-area offerings are keeping prices in a depressed state. Prices on No. 1 RR heavy melting, rerolling rails, unstripped motor blocks and cast grades are down $1.

Cincinnati — The market broke sharply as both mill and industrial prices moved down. Mill prices for dealer openhearth grades fell $2 to $3 below last month's level. Tonnages were also down. Industrial lists dropped $2 or more.

Birmingham—There is only a fair amount of trading. An openhearth user bought limited tonnages of No. 2 bundles $1 below its last purchase. Cast grades are moving better. This is despite a recent $2 a ton increase in price and the fact some pipe mills in the area are closed by strikes.

Buffalo—The market shows little real strength. The only recent activity was a small sale of No. 2 bundles at quoted prices.

Boston—The market is still drifting along with practically no business. Prices are unchanged.

West Coast—Mills remain on the sidelines showing no signs of buying. As a result, the domestic market is very slow. Export orders are good with No. 1 heavy melting in demand.

Houston — The market remains depressed. The district mill, despite earlier reports, is out of the market for an indefinite period.

SCRAP PRICES *(Effective May 3, 1960)*

Pittsburgh

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	36.00 to 37.00
No. 1 factory bundles	39.00 to 40.00
No. 2 bundles	27.00 to 28.00
No. 1 busheling	34.00 to 35.00
Machine shop turn.	16.00 to 17.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	20.00 to 21.00
Low phos. punch'gs plate	41.00 to 42.00
Heavy turnings	30.00 to 31.00
No. 1 RR hvy. melting	38.00 to 39.00
Scrap rails, random lgth	52.00 to 53.00
Rails 2 ft and under	58.00 to 59.00
RR specialties	46.00 to 47.00
No. 1 machinery cast.	50.00 to 51.00
Cupola cast.	44.00 to 45.00
Heavy breakable cast.	42.00 to 43.00
Stainless	
18-8 bundles and solids	210.00 to 215.00
18-8 turnings	110.00 to 115.00
430 bundles and solids	105.00 to 110.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	31.00 to 32.00
No. 1 factory bundles	35.00 to 36.00
No. 2 bundles	20.00 to 21.00
No. 1 busheling	30.00 to 31.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Low phos. forge crops	43.00 to 44.00
Low. phos. punch'gs plate, ¼ in. and heavier	37.00 to 38.00
Low phos. 2 ft and under	35.00 to 36.00
No. 1 RR hvy. melting	34.00 to 35.00
Scrap rails, random lgth	45.00 to 46.00
Rerolling rails	53.00 to 54.00
Rails 2 ft and under	52.00 to 53.00
Angles and splice bars	44.00 to 45.00
RR steel car axles	50.00 to 51.00
RR couplers and knuckles	41.00 to 42.00
No. 1 machinery cast.	51.00 to 52.00
Cupola cast.	45.00 to 46.00
Cast iron wheels	37.00 to 38.00
Malleable	49.00 to 50.00
Stove plate	41.00 to 42.00
Steel car wheels	41.00 to 42.00
Stainless	
18-8 bundles and solids	205.00 to 210.00
18-8 turnings	105.00 to 110.00
430 bundles and solids	105.00 to 110.00
430 turnings	50.00 to 55.00

Philadelphia Area

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	36.00 to 37.00
Machine shop turn.	18.00 to 19.00
Mixed bor. short turn.	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Shoveling turnings	22.00 to 23.00
Clean cast. chem. borings	25.00 to 26.00
Low phos. 5 ft and under	37.00 to 38.00
Low phos. 2 ft punch'gs	39.00 to 40.00
Elec. furnace bundles	37.00 to 38.00
Heavy turnings	28.00 to 29.00
RR specialties	43.00 to 44.00
Rails, 18 in. and under	58.00 to 60.00
Cupola cast.	40.00 to 41.00
Heavy breakable cast.	42.00 to 43.00
Cast iron car wheels	44.00 to 45.00
Malleable	55.00 to 56.00
No. 1 machinery cast.	51.00 to 52.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$29.00 to $30.50
No. 2 hvy. melting	25.00 to 26.50
No. 1 dealer bundles	29.00 to 30.50
No. 2 bundles	19.50 to 20.50
Machine shop turn.	13.00 to 14.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	15.00 to 16.00
Low phos. 18 in. and under	39.00 to 40.00
Rails, random length	48.00 to 49.00
Rails, 18 in. and under	55.00 to 56.00
No. 1 cupola cast.	41.00 to 42.00
Hvy. breakable cast.	36.00 to 37.00
Drop broken cast.	49.00 to 50.00

Youngstown

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	16.00 to 17.00
Shoveling turnings	20.00 to 21.00
Low phos. plate	36.00 to 37.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Cleveland

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	23.50 to 24.50
No. 1 dealer bundles	32.00 to 33.00
No. 1 factory bundles	36.00 to 37.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	32.00 to 33.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Cut structural & plates, 2 ft & under	40.00 to 41.00
Drop forge flashings	32.00 to 33.00
Low phos. punch'gs plate	33.00 to 34.00
Foundry steel, 2 ft & under	34.00 to 35.00
No. 1 RR hvy. melting	37.00 to 38.00
Rails 2 ft and under	57.00 to 58.00
Rails 18 in. and under	61.00 to 62.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	55.00 to 56.00
No. 1 machinery cast.	55.00 to 56.00
Stove plate	48.00 to 49.00
Malleable	49.00 to 50.00
Stainless	
18-8 bundles	210.00 to 215.00
18-8 turnings	90.00 to 95.00
430 bundles	95.00 to 100.00

Buffalo

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 busheling	30.00 to 31.00
No. 1 dealer bundles	30.00 to 31.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	16.00 to 17.00
Low phos. plate	40.00 to 41.00
Structurals and plate, 2 ft and under	40.00 to 41.00
Scrap rails, random lgth	38.00 to 39.00
Rails 2 ft and under	48.00 to 49.00
No. 1 machinery cast.	46.00 to 47.00
No. 1 cupola cast.	43.00 to 44.00

St. Louis

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	29.00 to 30.00
Foundry steel, 2 ft	32.00 to 33.00
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	19.00 to 20.00
Machine shop turn.	13.00 to 14.00
Shoveling turnings	15.00 to 16.00
Cast iron borings	18.00 to 19.00
No. 1 RR hvy. melting	35.00 to 36.00
Rails, random lengths	43.00 to 44.00
Rails, 18 in. and under	46.00 to 47.00
RR specialties	42.00 to 43.00
Cupola cast.	45.00 to 46.00
Heavy breakable cast.	34.00 to 35.00
Stove plate	40.00 to 41.00
Cast iron car wheels	35.00 to 36.00
Rerolling rails	53.00 to 54.00
Unstripped motor blocks	36.00 to 37.00

Birmingham

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	30.00 to 31.00
No. 2 bundles	20.00 to 21.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	21.00 to 22.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	12.00 to 13.00
Electric furnace bundles	35.00 to 36.00
Elec. furnace, 3 ft & under	33.00 to 34.00
Bar crops and plate	40.00 to 41.00
Structural and plate, 2 ft	39.00 to 40.00
No. 1 RR hvy. melting	34.00 to 35.00
Scrap rails, random lgth	43.00 to 44.00
Rails, 18 in. and under	47.00 to 48.00
Angles and splice bars	42.00 to 43.00
No. 1 cupola cast.	50.00 to 51.00
Stove plate	49.00 to 50.00
Cast iron car wheels	42.00 to 43.00
Unstripped motor blocks	40.00 to 41.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	21.00 to 22.00
No. 2 dealer bundles	16.00 to 17.00
Machine shop turnings	7.00 to 8.00
Mixed bor. and turn.	9.00 to 10.00
Stoveling turnings	10.00 to 11.00
Clean cast. chem. borings	20.00 to 21.00
No. 1 machinery cast.	38.00 to 39.00
Mixed yard cast.	35.00 to 36.00
Heavy breakable cast.	33.00 to 34.00
Stainless	
18-8 prepared solids	195.00 to 200.00
18-8 turnings	85.00 to 90.00
430 prepared solids	80.00 to 85.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	16.00 to 17.00
No. 1 dealer bundles	30.00 to 31.00
No. 2 bundles	15.00 to 16.00
No. 1 busheling	28.00 to 29.00
Drop forge flashings	28.00 to 29.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Heavy breakable cast.	37.00 to 38.00
Mixed cupola cast.	39.00 to 40.00
Automotive cast.	46.00 to 47.00
Stainless	
18-8 bundles and solids	190.00 to 195.00
18-8 turnings	60.00 to 65.00
430 bundles and solids	70.00 to 75.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	22.00 to 23.00
No. 1 dealer bundles	27.00 to 28.00
No. 2 bundles	13.00 to 14.00
No. 1 busheling	27.00 to 28.00
Machine shop turn.	6.00 to 7.00
Shoveling turnings	9.00 to 10.00
Clean cast. chem. borings	13.00 to 14.00
No. 1 machinery cast.	39.00 to 40.00
Mixed cupola cast.	32.00 to 33.00
Heavy breakable cast.	30.00 to 31.00

San Francisco

No. 1 hvy. melting	....	$34.00
No. 2 hvy. melting	....	30.00
No. 1 dealer bundles	....	30.00
No. 2 bundles	....	20.00
Machine shop turn.	$14.00	to 15.00
Cast iron borings	14.00	to 15.00
No. 1 cupola cast.	....	44.00

Los Angeles

No. 1 hvy. melting	....	$32.00
No. 2 hvy. melting	....	29.00
No. 1 dealer bundles	....	27.00
No. 2 bundles	....	17.00
Machine shop turn.	....	15.00
Shoveling turnings	....	15.00
Cast iron borings	$15.00	to 16.00
Elec. furn. 1 ft. and under (foundry)	....	41.00
No. 1 cupola cast.	....	37.00

Seattle

No. 1 hvy. melting	....	$35.00
No. 2 hvy. melting	....	33.00
No. 2 bundles	....	22.00
No. 1 cupola cast.	....	36.00
Mixed yard cast.	....	36.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	....	$32.25
No. 2 hvy. melting	....	28.25
No. 1 dealer bundles	....	32.25
No. 2 bundles	....	20.00
Mixed steel scrap	....	24.25
Bush., new fact., prep'd	....	32.25
Bush., new fact., unprep'd	....	26.25
Machine shop turn.	....	14.00
Short steel turn.	....	17.00
Mixed bor. and turn.	....	13.00
Cast scrap	$46.50	to 48.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	....	$34.00
No. 2 hvy. melting	....	31.00
No. 2 bundles	....	19.00
Machine shop turn.	....	15.00
Shoveling turnings	....	17.00
Cut structural plate 2 ft & under	$41.00	to 42.00
Unstripped motor blocks	29.00	to 30.00
Cupola cast.	34.00	to 35.00
Heavy breakable cast.	26.00	to 27.00

Aluminum Troubles Aired in Congress

Yates Committee again summons aluminum makers, users and suppliers to study relationship of major producers with the small companies in the industry.

Hot metal contracts are sure to be a key issue in the hearings this week.

■ Attention of the aluminum industry is focused on Washington this week, where Rep. Sidney R. Yates (D., Ill.) opened hearings Monday on the relationship of the major producers with small companies in the industry.

The tentative schedule would indicate the hearings can be concluded in just a week. However, it's doubtful if they can be completed in that time.

On the Agenda—Previous hearings ran over because of extensive questioning of witnesses. This is likely to be the case again. Also, Aluminium Ltd., the major Canadian producer with a sales subsidiary and a smelting operation in the U. S., had been invited to testify. But company president Nathanael V. Davis has been excused until next week or later because of prior commitments.

The representatives of small business, and the government, will take the stand first. Then will come spokesmen for the Big Three U. S. aluminum producers and the Big Three major U. S. automakers.

Based on pre-hearing comments, here is how some of the witnesses see the situation:

Hot Metal Issue — Richard E. Kellers, associate secretary of the American Die Casting Institute, says that because of discriminatory prices for aluminum casting alloy stemming from hot metal contracts, the automotive aluminum diecasting market has become a captive market.

Mr. Kellers points out that in 1949, 70.9 pct of automotive aluminum diecastings were bought from custom casters. In 1959, he reports, this had dropped to 38.4 pct. Casting shops within auto companies now supply over 61 pct.

The hot metal contracts Mr. Kellers refers to are contracts in which the buyers take metal in molten form at a lower price than pig.

Other Viewpoints — Si Wakesberg, speaking for the Secondary Metal Institute of the National Assn. of Waste Material Dealers, supports the contention that hot metal prices are discriminatory.

Carl Burton, of the Aluminum Smelters Research Institute, takes issue with the Bureau of Foreign Commerce for its lack of action to stem the flow of aluminum scrap out of the country. Most of the members of the ASRI are secondary smelters. Mr. Burton contends that exports are excessive.

But M. J. Mighdoll, representing the Metal Dealers Div., and the Foreign Trade Div. of NAWMD, insists that the percent of aluminum scrap exported is very small compared to domestic consumption. In fact, he says 1959 was not the peak year for aluminum scrap exports despite that the issue was first raised last year.

Extruders' Positions—Walter A. Edwards, Deputy Assistant Secretary of Commerce for Domestic Affairs, insists that, from what the government can discover, there is no shortage of aluminum scrap. In fact, he considers markets pretty well in balance.

Leonard Starr, Michael Flynn Co., Philadelphia, speaks for the Aluminum Extruders Council. His position is pretty much unchanged from the last hearing — primary metal prices are kept high by producers while extrusion prices are sliced to the bone, squeezing independents.

Near the middle of the week the primary producers and the automakers take the floor. The big issue here is prices—specifically hot metal prices.

Tin prices for the week. April 27—99.25; April 28—99.25; April 29—99.25; May 2—98.875; May 3—98.75*.

* Estimate.

Monthly Average Metal Prices

(Cents per lb except as noted)

Average prices of the major nonferrous metals in APRIL based on quotations appearing in THE IRON AGE, were as follows:

Electrolytic copper, del'd Conn. Valley	33.00
Copper, Lake	33.00
Straits, Tin, New York	99.28
Zinc, E. St. Louis	12.90
Lead, St. Louis	11.80
Aluminum ingot	28.10

Note: Quotations are on going prices

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum pig	26.00	24.70	12/17/59
Aluminum ingot	28.10	26.80	12/17/59
Copper (E)	33.00	30-33	11/12/59
Copper (CS)	33.00	35.00	3/11/60
Copper (L)	33.00	31.50	11/6/59
Lead, St. L.	11.80	12.30	12/21/59
Lead, N. Y.	12.00	12.50	12/21/59
Magnesium ingot	36.00	34.50	8/13/58
Magnesium pig	35.25	33.75	8/13/58
Nickel	74.00	64.50	12/8/59
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	13.00	12.50	1/8/60
Zinc, N. Y.	13.50	13.00	1/8/60

ALUMINUM: 99% Ingot COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. TIN: See above; Other primary prices, pg. 129.

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.038	.048-.061	.077-.096	.136-.250
1100, 3003	47.8	47.3	46.2	45.1
5052	54.2	53.0	50.8	49.2
6061-0	51.0	49.8	47.9	46.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	44.7-46.2	53.2-60.8
18-32	45.2-46.8	57.7-79.9
33-38	48.8-51.4	83.3-94.5
39-44	58.7-62.4	99.9-121.0

Screw Machine Stock—2011-T-3

Size"	¼	5/16-⅜	7/16-1	1¼-1½
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.823
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	57.13	.....	54.86	58.32
Brass, Yellow	50.57	50.86	50.26	54.23
Brass, Low	53.53	53.82	53.22	57.09
Brass, R L	54.58	54.87	54.27	58.14
Brass, Naval	55.12	.....	48.68	58.78
Muntz Metal	53.20	.....	48.26	.....
Comm. Bz.	56.17	56.46	55.86	59.48
Mang. Bz.	58.86	.....	52.21	.....
Phos. Bz. 5%	77.44	.....	78.13	.....

Free Cutting Brass Rod 36.06

TITANIUM

(Base prices f.o.b. mill)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; Bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex. 29.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be $74.75
Beryllium copper, per lb conta'd Be $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismouth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.50
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base .... $ 1.31
Cobalt, 97-99% (per lb) .... $1.75 to $1.82
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 29.95 to 36.95
Gold, U. S. Treas., per troy oz. $35.00
Indium, 99.9%, dollars per troy oz. $2.25
Iridium, dollars per troy oz. .. $75 to $85
Lithium, 98% ..... $9.00 to $12.00
Magnesium sticks, 10,000 lb. 57.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $213 to $215
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz. . $24 to $26
Platinum, dollars per troy oz. . . $82 to $85
Rhodium ..... $137 to $140
Silver ingots (¢ per troy oz.) 91.375
Thorium, per kg. $43.00
Vanadium ..... $ 3.65
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 29.25
- No. 120 ..... 28.25
- No. 123 ..... 27.25

80-10-10 ingot
- No. 305 ..... 33.75
- No. 315 ..... 31.50

88-10-2 ingot
- No. 210 ..... 42.00
- No. 215 ..... 38.75
- No. 245 ..... 34.00

Yellow ingot
- No. 405 ..... 23.75

Manganese bronze
- No. 421 ..... 28.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper max. 25.75-26.00
- 0.60 copper max. 25.50-25.75

Piston alloys (No. 132 type) .. 28.00-29.00
No. 12 alum. (No. 2 grade) 24.75-25.25
108 alloy 25.25-25.75
195 alloy 27.75-28.75
13 alloy (0.60 copper max.) ... 25.75-26.00
AXS-679 (1 pct zinc) 25.00-26.00

(Effective May 2, 1960)

Steel deoxidizing aluminum notch bar granulated or shot
- Grade 1—95-97½% 25.25-26.25
- Grade 2—92-95% 24.00-25.00
- Grade 3—90-92% 23.00-24.00
- Grade 4—85-90% 22.50-23.50

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	29	28¼
Yellow brass	22¼	20¼
Red brass	25¾	25
Comm. bronze	26½	26
Mang. bronze	20¾	20
Free cutting rod ends	21¼	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 26½
- No. 2 copper wire 24¾
- Light copper 22½
- *Refinery brass 22¾
- Copper bearing material 21

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 26½
- No. 2 copper wire 24¾
- Light copper 22½
- No. 1 composition ..... 2[illegible]
- No. 1 comp. turnings 20½
- Hvy. yellow brass solids 15
- Brass pipe 14½
- Radiators 16

Aluminum

- Mixed old cast. ..... 14½—15½
- Mixed new clips ..... 16½—17½
- Mixed turnings, dry ..... 15 —16

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

- No. 1 copper wire ..... 23 —23½
- No. 2 copper wire ..... 20 —20½
- Light copper ..... 18 —18½
- Auto radiators (unsweated) . 12½—13
- No. 1 composition ..... 16½—17
- No. 1 composition turnings .. 15½—16
- Cocks and faucets ..... 13 —13½
- Clean heavy yellow brass ... 11¾—12¼
- Brass pipe ..... 13½—14
- New soft brass clippings .... 14 —14½
- No. 1 brass rod turnings .... 11½—12

Aluminum

- Alum. pistons and struts .... 7½— 8
- Aluminum crankcase ..... 11¼—11¾
- 1100 (2s) aluminum clippings 15 —15½
- Old sheet and utensils ..... 11¼—11¾
- Borings and turnings ..... 7 — 7½
- Industrial castings ..... 11¼—11¾
- 2020 (24S) clippings ..... 12½—13

Zinc

- New zinc clippings ..... 7 — 7¼
- Old zinc ..... 4½— 5
- Zinc routings ..... 3¼— 3½
- Old die cast scrap ..... 2¾— 3

Nickel and Monel

- Pure nickel clippings 52-54
- Clean nickel turnings 40
- Nickel anodes 52-54
- Nickel rod ends 52-54
- New Monel clippings 28-29
- Clean Monel turnings 20-22
- Old sheet Monel 24-26
- Nickel silver clippings, mixed 18
- Nickel silver turnings, mixed 15

Lead

- Soft scrap lead ..... 8 — 8¼
- Battery plates (dry) ..... 3 — 3¼
- Batteries, acid free ..... 2 — 2¼

Miscellaneous

- Block tin ..... 75 —76
- No. 1 pewter ..... 55 —56
- Auto babbitt ..... 39 —40
- Mixed common babbitt ..... 9¾—10¼
- Solder joints ..... 13¼—13¾
- Siphon tops 41
- Small foundry type ..... 9¾—10¼
- Monotype ..... 9¾—10¼
- Lino. and stereotype ..... 8¾— 9
- Electrotype ..... 7½— 7¾
- Hand picked type shells .... 5¼— 5¾
- Lino. and stereo. dross ..... 2¼— 2¾
- Electro dross ..... 2¼— 2¾

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8*	7.575 *W8*		8.40 *W8, S9,I3*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*			6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

(Effective May 2, 1960)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Coke* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Holloware Enameling *29* ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*	6.775 *B3*		7.525 *B3*	9.275 *B3*	10.825 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1**, *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.825 *U1, J3*	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2, R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

*Electrogalvanized sheets.

(Effective May 2, 1960)

*7.425 at Sharon-Niles is 7.225

STEEL PRICES

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		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.375 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7, A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,13*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Plymouth, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*					5.30 *N4*				8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, B5*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*				9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.675 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective May 2, 1960) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Chicago, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	97.3	9.94	9.53	13.24	.....	.....	.....	.....
Baltimore**	$.10	8.63	10.10	10.16[6]	11.04	9.25	10.02	9.43	11.90	17.48	16.48	21.58	20.83
Birmingham**		7.43	9.50	9.89	8.91	7.79	8.00	9.09	13.14	16.76	.....	.....	.....
Boston**	.10	9.77	10.68	11.87	12.26	9.72	10.26	7.59	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	8.95	10.10	11.30	10.80	9.15	9.80	9.15	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	8.89	10.35	11.10	10.55	8.82	9.48	8.99	10.80	17.10	16.10	19.70	20.45
Cincinnati**	.15	9.06	10.41	11.10	10.87	9.20	10.04	9.31	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	8.88[1]	10.03	11.29	10.66	9.07	9.90	9.11	11.40	17.21	16.21	21.31	20.56
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19	.....	.....	.....	20.84
Detroit**	.15	9.15	10.61	11.45	10.92	9.19	10.04	9.30	11.16	17.38	16.38	21.48	20.73
Houston**		9.22	10.03	12.193	10.78	8.95	8.86	8.63	13.10	17.50	16.55	21.55	20.85
Kansas City**	.15	9.36	11.02	11.50	11.02	9.25	9.95	9.46	11.72	17.17	15.87	21.87	21.12
Los Angeles**		9.95[1]	11.55	12.20	11.55	10.00	10.00	9.75	14.20	18.30	17.35	22.90	22.20
Memphis	.15	8.55	9.80	.....	8.60	8.93	9.01	8.97	12.11	.....	.....	.....	.....
Milwaukee**	.15	9.03	10.49	11.24	10.69	8.96	9.70	9.13	11.04	17.24	16.24	21.24	20.49
New York	.10	9.46	10.23	11.45	11.56	9.61	10.30	9.84	13.35	16.16	16.50	20.10	20.85
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	9.20	10.10	10.99	11.20	9.65	9.95	9.60	12.05	16.58	16.48	20.08	20.03
Pittsburgh**	.15	8.88	10.03	11.18	10.64	8.83	9.51	9.00	11.40	17.10	16.10	19.70	20.45
Portland		10.00	11.75	13.30	11.95	11.50	11.10	9.85	15.30	18.50	17.45	20.75	20.25
San Francisco**	.10	11.00	11.95[2]	11.65	12.25	11.00	10.95	10.75	15.20	18.30	17.35	22.90	22.20
Seattle**		11.55	12.30	12.50	12.65	11.00	10.20	11.10	16.20	18.60	17.80	22.70	22.20
Spokane**	.15	11.70	12.45	12.65	13.30	11.15	11.35	11.75	16.35	17.75	17.95	21.58	22.35
St. Louis**	.15	8.69	10.73	11.48	10.65	8.93	9.60	9.10	11.43	17.48	16.48	21.58	20.83
St. Paul**	.15	9.19	9.74	10.89	10.81	9.10	9.78	9.27	11.64	.....	16.69	.....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** These cities are on net pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—¼" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—⅞-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 13¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter. [6] 10 ga. x 48 — 120.

(Effective May 2, 1960)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50	.....	.....
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
‡Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†,
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Sweedland *A2*	68.00	68.50	69.00	69.50	73.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31–0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1, I4*, (Globe Div.), $78.00; Niagara Falls (15.01–15.50), $101.00; Keokuk (14.01–14.50), $89.00; (15.51–16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container)	Pct
Plain finish—packaged and bulk	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container)	Pct
Plain finish—packaged and bulk	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)	
Plain finish—packaged and bulk	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

(On all the above categories add 25 pct for less than container quantities. Minimum plating charge—$10.00 per item. Add 7½ pct for nuts assembled to bolts)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Bolts
Full Cartons	46	46

Machine Screws—bulk

¼ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in. diam	15,000 pcs	50

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Square
Full Cartons	46	57
Bulk		
¼ in. diam or smaller	25,000 pcs	
5/16 or ⅜ in. diam	56	60
	15,000 pcs	
	56	60

Rivets

	Base per 100 lb
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1959 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective May 2, 1960)

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	31.75 48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	43.75	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown. *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford. Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Ambridge, Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* wensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	173	187	.....	212	193	9.00	9.55
Aliquippa *J3***	173	190	.....	.....	190	9.00	9.675
Atlanta *A8***	175	193	.....	214	199	9.10	9.85
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dav. *M4***	175	193	.....	214	199	9.10	9.85
Donora, Pa. *A5*	173	187	.....	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	.....	212	193	9.00	9.55
Galveston *D4*	9.10†	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	.....	217	198	9.25	9.80†
Jacksonville *M4*	184‡	197	.....	219	203	9.10	9.775
Johnstown *B3***	173	190	177	.....	196	9.00	9.675
Joliet, Ill. *A5*	173	187	.....	212	193	9.00	9.55
Kokomo *C9**	175	189	.....	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	.....	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	.....	.....	213	9.95	10.50
Rankin Pa. *A5*	173	187	.....	.....	193	9.00	9.55
So. Chicago *R3*	173	187	.....	.....	193	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	.....	9.95	10.50
SparrowsPt. *B3***	175	.....	.....	215	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	*6.25	.....	*2.25	.....	0.75	.....	1.25	.....	1.75	.....	2.25	.....	2.75	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.00¢ per lb.

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	139.8
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

Furnace, beehive (f.o.b.)	Net-Ton
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Ironton, O., f.o.b.	30.50
Detroit f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00

(Effective May 2, 1960)

Kearney, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.85
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

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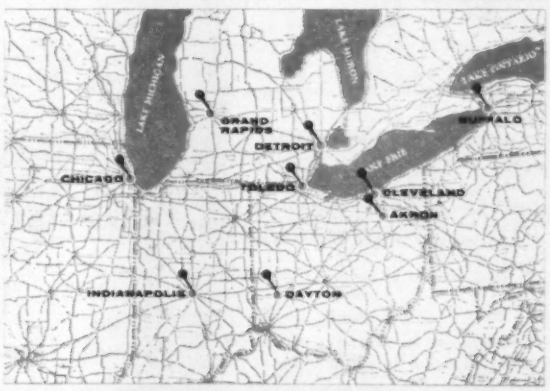

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RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25			
Cleveland *R5*						15.35
So. Chicago *R5*				10.10		
Ensley *T2*	5.75	6.725				
Fairfield *T2*		6.725		10.10	6.875	
Gary *U1*	5.75				6.875	
Huntington, *C16*		6.725				
Ind. Harbor *I5*				10.10		
Johnstown *B5*		6.725				
Joliet *U1*			7.25			
Kansas City *S2*				10.10		15.35
Lackawanna *B3*	5.75	6.725	7.25		6.875	
Lebanon *B5*			7.25			15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *S14*						15.35
Pittsburgh *J3*				10.10		
Seattle *B2*					6.75	15.85
Steelton *B3*	5.75		7.25		6.875	
Struthers *Y1*				10.10		
Torrance *C7*					6.75	
Williamsport *S5*		6.725				
Youngstown *R3*				10.10		

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *G4*	8.95	10.40	12.60	15.60	18.55
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*		10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Chicago				15.60	
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70		
Detroit *D1*	9.05	10.50	12.70	15.70	
Detroit *D2*	9.05	10.50	12.70		
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60		
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*			12.90	16.10	19.30
Indianapolis *R3*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*		10.70	12.90	16.10	19.30
Warren, Ohio *T4*	8.95	10.40	12.60	15.30	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper

Rolled elliptical, 18 in. or longer, 5000 lb lots 48.00
Electrodeposited 40.00
Brass, 80-20, ball anodes, 2000 lb or more 53.00
Zinc, ball anodes, 2000 lb lots 19.75
(for elliptical add 1¢ per lb)
Nickel, 99 pct plus, rolled carton, 5000 lb 1.0225
(Rolled depolarized add 3¢ per lb)
Cadmium, 5000 lb 1.30
Tin, ball anodes $1.05 per lb (approx.).

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum..... 65.90
Copper sulphate, 100 lb bags, per cwt. 27.75
Nickel salts, single, 100 lb bags.... 36.00
Nickel chloride, freight allowed, 100 lb 45.00
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums 23.70
(Philadelphia price 25.00)
Zinc cyanide, 100 lb 60.75
Potassium cyanide, 100 lb drum N. Y. 45.50
Chromic acid, flake type, 10,000 lb or more 30.44

METAL POWDERS

(Cents per lb, f.o.b. shipping point for ton lots or over, except as noted)

Iron Powders

Molding grade, domestic and foreign, 98 pct Fe, 100 mesh bags, freight allowed east of Miss. R. 11.50
Electrolytic Iron, melting stock, 99.87 pct Fe.... 28.75
Carbonyl Iron 88.00
Welding Grades 8.10
Cutting and Scarfing Grades 9.85

Copper Powders

Molding Grades
Electrolytic, domestic, f.o.b. shipping point. 15.00†
Atomized ..... 46.5 to 64.5
Reduced ..... 15.00†
Chemically Precipitated 15.00†
Brass, 5000-lb lots ..... 35.1 to 52.2
Bronze, 5000-lb lots ..... 53.1 to 56.7
Chromium, electrolytic 5.00
Lead ..... 7.50†
Manganese, electrolytic ... $1.00
Molybdenum .....$3.60 to $4.35
Nickel $1.15
Carbonyl Nickel, 20,000 lb lots $1.01
Nickel-Silver, 5000 lb lots.. 60.7 to 69.0
Silicon 70.00
Solder ..... 7.00†
Stainless Steel, 316 ..... $1.07
Tin ..... 14.00†
Titanium, 99.25 + pct, per lb, f.o.b. $11.25
Tungsten .....$3.15 (nominal)

† Plus cost of metal.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field	.....	9 875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor	.....	12.475	.....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30		
		Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, C4, A3, J2*) 10 pct	15 pct	20 pct	Sheet (*I2*) 20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	28.80	31.55	34.30	40.00
	316	42.20	46.25	50.25	58.75
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 44.20; 1 side, 36.80.

(Effective May 2, 1960)

REFRACTORIES

Fire Clay Brick

Carloads per 1000

Super duty, Mo., Pa., Md., Ky.... $185.00
High duty (except Salina, Pa., add $5.00) 140.00
Medium duty 125.00
Low duty (except Salina, Pa., add $2.00) 103.00
Ground fire clay, net ton, bulk... 22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala. $158.00
Childs, Hays, Latrobe, Pa. 163.00
Chicago District 168.00
Western Utah 183.00
California 165.00
Super Duty
Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville 163.00-168.00
Silica cement, net ton, bulk, Latrobe 29.75
Silica cement, net ton, bulk, Chicago 26.75
Silica cement, net ton, bulk, Ensley, Ala. 27.75
Silica cement, net ton, bulk, Mt. Union 25.75
Silica cement, net ton, bulk, Utah and Calif. 39.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.$109.00
Standard chemically bonded, Curtiner, Calif. 119.00
Burned, Balt. 103.00

Magnesite Brick

Standard, Baltimore $140.00
Chemically bonded, Baltimore 119.00

Grain Magnesite

St. ⅜ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk. $73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.
in bulk 46.00
in sacks 52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in:
Pa., W. Va., Ohio $16.75
Missouri Valley 15.60
Midwest 17.00

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	Length (In.)	Price	CARBON* Diam. (In.)	Length (In.)	Price
24	84	27.25	40	100, 110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12 55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	B.W. Ga.	Seamless H.R.	C.D.	Elec. Weld H.R.
Babcock & Wilcox..	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
National Tube.....	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel...	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

COLUMBIA TOOL STEELS

Atmodie Smoothcut (D2S) free machining high chrome air hardening die steel gives a real "run for the money."

Product of Skilled American Workmen

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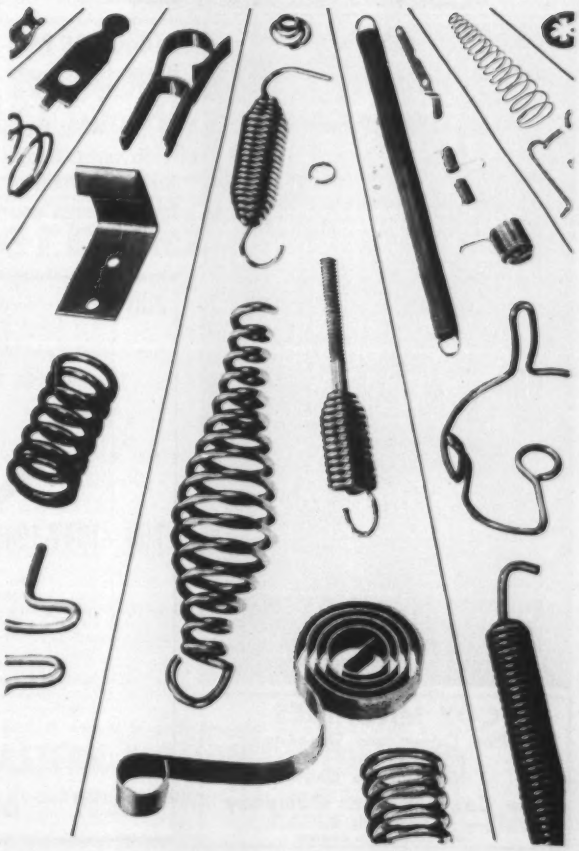
CLEVELAND 5, OHIO



REBUILT—GUARANTEED
ELECTRICAL EQUIPMENT

MOTOR GENERATOR SETS

Qu.	KW	Make	D.C. Volts	A.C. Volts
1	3500	Al.Ch. (3-unit)	350	13800/4160
1	3000	Al.Ch. (3-unit)	600	13800/4160
1	2400	G.E.	300	4600/2300
1	1520	S.&S. (3-unit)	600	2300
1	1500	G.E.	250	4600/2300
1	1325	Whse.	600	2300
1	1250	G.E.	132/265	4160
1	1060	S.&S.	600	2300
2	500	G.E.	250	4160/2400
1	350	G.E.	250	4000/2300
1	300	Al.Ch. (3-unit)	250	2300
1	300	G.E.	250	4000/2300
3	250	Whse.	250	4000/2300
2	200	G.E.	250/275	4000/2300
2	150	G.E.	250	440
1	150	Reliance	125	2300
1	125	G.E.	250	2300/440
1	100	G.E.	250	4000/2200
1	75	G.E.	250	2300/440

DIRECT CURRENT MOTORS
Adjustable and Constant Speed
(Suitable for MILL and STANDARD DUTY)

Qu.	H.P.	Make	Volts	R.P.M.
1	3000	G.E.	600	90/180
2—N-*	3000	Whse.	600	600
2—N-*	2700	G.E.	415	280
1—N-*	2500	Whse.	700	108/162
1—N-*	2200	Whse.	600	92/132
2—N-*	2000	G.E.	350	230/350
2—N-*	1750	G.E.	600	200/300
1— *	1500	Al.Chal.	600	120/240
3—N-*	1500	Whse.	600	300/700
2—N-*	1400	G.E.	250	165/300
6—N-*	750	Whse.	250	300/700
1	750	Whse.	250	200/400
2— *	650	S.&S.	300	1000/1350
2	600	Al.Chal.	600	300/600
1	600	Whse.	250	110/220
2	300	Whse.	230	300/600
2	235	Whse.	230	325/975
1	150	Whse.	230	400/1200
1	125	Whse.	230	450/1050
3	125	Whse.	230	350/1125
1—N-*	100	Whse.	250	350/700

N—New and unused.
*—Enclosed forced ventilated.

(1)—1250-KVA Whse. Hi-Cycle Frequency Set, 800-V., 960 cycle with 1875-HP syn. motor, 2300-V., 3 ph., 60 cy. with all switchgear.

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COX MACHINES
Pipe Cutting and Threading
Tube Cutoff
New Machines Only
The Cox and Sons Company
Bridgeton, N. J.
Catalogue upon Request

Sales Level Off As Business Lags

■ Used machine sales across the nation are leveling out, but remain below those of a year ago. And sales in March were down somewhat from February.

Earlier this year dealers expected sales to climb rapidly as industry picked up momentum following the long steel strike. A lift in sales did come, but it did not approach what was anticipated. In fact, New York sales haven't gained much at all over strike levels. And a dealer in Camden, N. J., last month reported that business was still very slow. Pittsburgh, too, reports little activity.

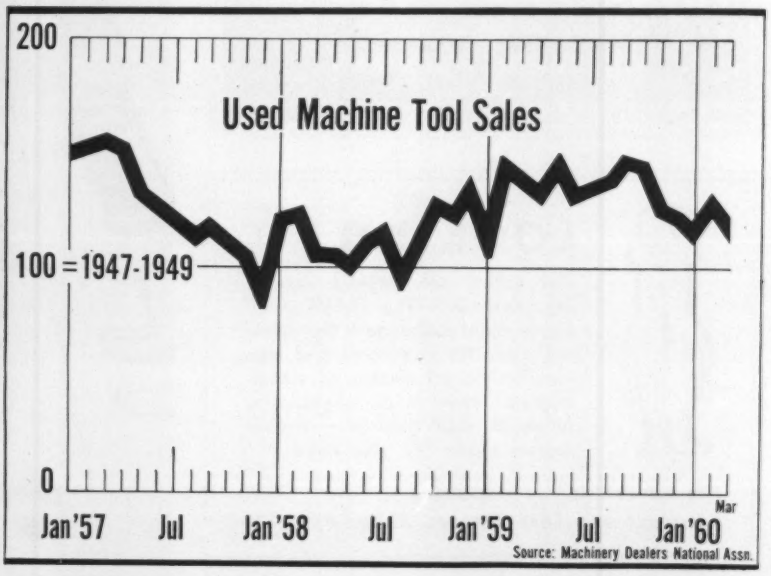
East and West—However, major business step-ups did occur in Philadelphia, Detroit and in some areas of the West Coast.

In most areas, inquiry rates have jumped. Much of the interest comes from foreign countries.

The Machinery Dealers National Assn. reports that March sales dropped 8.9 pct from February levels. But the number of sales of machine tools valued at $200 or more increased 4.6 pct. Dollar value of dealer inventories rose .9 pct, while numbers of units in inventories dropped 1.6 pct.

Year to Year — In comparison with March 1959 levels, the picture is even worse. Sales are off 15.4 pct. Machine tool sales of machines valued at over $200 are down 15.9 pct. The dollar value of inventories has risen 16.2 pct, while the number of units in inventory decreased 2.2 pct.

Dealers, however, are still optimistic that 1960 will end up as a good sales year. One reason: They can guarantee fast deliveries on most items. This, they feel, will help stimulate buying interest.



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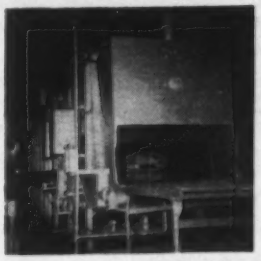
Roller Hearth, 948 K.W. Capacity Equal to New Condition. 27" x 62" Opening, 112' long Convection Circulating Fans. Water Cooled—60' Cooling Chamber 5 ton per hour capacity. Air lock Purge Chambers, Flame Curtain, Max. Temperature 1700. (Chromax) 8000 CFH *Atmosphere* Generators.

TWO FOR SALE



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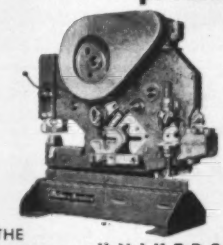
Solve your PUNCHING SHEARING NOTCHING **problems—**



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Sizes #0, #½, #1½, #2½, #3

Immediate Delivery

Dealers throughout the U.S.A.
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Corporation

328 Connell Building, Scranton 3, Pennsylvania
Diamond 3-1117 Cable MARAILQUIP

OVER 1,000 NEW AND USED MACHINE TOOLS IN STOCK

WRITE FOR LATEST STOCK LIST

MILES MACHINERY COMPANY

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USED and RECONDITIONED

RAILWAY CARS and REPAIR PARTS

FLAT CARS

4—50-Ton Capacity, 43' long
Steel Underframe

30—Used, All-Steel
30-Cubic Yard, 50-Ton Capacity
MAGOR AIR DUMP CARS
Excellent Condition—Immediate Delivery

DIESEL-ELECTRIC LOCOMOTIVES
1, G. E. 25-Ton, 150 H.P., Std. Ga.
3, G. E. 44-Ton, 400 H.P., Std. Ga.
1, G. E. 80-Ton, 500 H.P., Std. Ga.
1, 125-Ton RAILROAD TRACK SCALE

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atmosphere-controlled with 9 bases, are available. Each is approximately 7' x 7' x 14'. Excellent when used for manufacture of steel coils, they have a capacity of 50 tons per charge. These top-grade furnaces are still set up in the plant. Tremendous values specially priced for prompt sale.

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No. 5L Gisholt, 1946
No. 6.2 Denver Acme Ram Type Universal, m.d., 1944
No. 7A Jones & Lamson Universal, m.d.

MISCELLEANEOUS

2000# Niles Single Frame Steam Hammer
100# Bradley Rubber Cushioned Helve Hammer, m.d.
No. 90H Williams & White Justice Hammer, single pulley drive
No. 125 Marken Marking Machine, m.d.
Sciaky Type PMCO-2S-31 Storage of Energy Spot Welder, 50-KW, 34" throat
Pratt & Whitney Standard Measuring Machine, 36" capacity
15" Gleason Quenching Press
LeRoi Electric Power Plant
38" face plate, Lathe, taper nose key mounted, new
Clamping Assembly to fit a 6.2 Denver Acme Turret Lathe
1 ton Shaw Electric Cable Hoist
Brown & Sharpe Universal Attachment, for use on 2A Brown & Sharpe Miller
Megatherm H.S. Induction Heating Unit
No. 74 Heald Workhead Assembly
6" Victor Swivel Vise, new
No. 00 Ingersoll-Rand, "Multivan" Air operated hand grinder, new
No. 1A Grant Riveter
King Boring Mill Table, 32" diameter, 4 jaw independent chuck, new
48" diameter Cleveland Universal Jig Co., Rotary Table
57" diameter Cleveland Universal Jig Co., Rotary Table
Jones & Lamson Automatic Die Head Hartness No. 7H
No. 26 Norton Hydrolap, m.d., late
Cincinnati Vertical Boring Mill Right Hand Side Head with Turret
Type 114-CB Moline Tool Boring Machine, 2 spindle type, m.d.
9x9" Curtis Model A Air Compressor
No. 870-30 Ton Pull Type Greenard Hydraulic Arbor Forcing & Assembly Press
Hanson & Whitney Single End Centering Machine, m.d.
No. 56 Sundstrand Double End Centering Machine, m.d.
Four (4) spindle Pratt & Whitney, Model N-1736 Auto. Duplicating Mach., m.d. new
63" Walker Rotary Magnetic Chuck, new
2½" to 6" capacity Landis Pipe Machine, m.d.

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ARC MELTING FURNACES
1—250# LECTROMELT—185 KVA
1—500# LECTROMELT—200 KVA
1—1000# SWINDELL
1—2000# SWINDELL—1000 KVA
1—3000# HEROULT, Door Charge—800 KVA
1—13' SWINDELL Top Charge—5000 KVA
DETROIT FURNACES—10 lb. to 3000 lb. Cap.

INDUCTION FURNACES
1—20 KW AJAX Spark Gap 17# Melting
1—30 KW VACUUM Melting, Complete—Like New
1—100 KW AJAX Melting Installation—Late
1—1250 KW AJAX—Unit

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1—4'x4'x10' Gas Fired Box
1—12"x36"x8" HAYES Hardening 40 KW
1—7' G. E. Rotary Hearth Electric, 1900°F.
1—36" dia. x 36" deep Electric Recirculating
1—210 KW LINDBERG conveyor type, 1400°F.

CLEANING EQUIPMENT AND GRINDERS
1—20x27 WHEELABRATOR
1—27x36 WHEELABRATOR w/loader *dust*
1—36x42 WHEELABRATOR w/loader *Collectors*
1—48x42 WHEELABRATOR w/loader *available*
1—48x48 WHEELABRATOR w/loader *for all*
1—72" WHEELABRATOR Swing Table *machines*
1—WHEELABRTOR No. 1-A Multi-Table
1—48" WHEELABRATOR Swing Table
1—PANGBORN Pipe Cleaner, 2" to 16" O.D.
1—SAFETY 10 H. Swing Grinder
1—WHITING 26"x54" tumbling barrel

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AETNA-STANDARD single & triple Draw Benches
125 Ton HYDRAULIC PRESS, Down Moving Ram
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3000 Kg. BRINELL Hardness-Tester

Model 43 LIQUIMATTE wet blasting cabinet, Brand New. Ideal for finishing and cleaning tools, dies, molds, etc.

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VARIABLE VOLTAGE DRIVES

3 PHASE 60 CYCLE

Quan.	Size	Description
2	3000 HP	DC MOTORS—525 V. 600 RPM Whse. M.G. Sets—2500 K.W. Whse., 2300/4160 V.
1	2750 HP	DC MOTOR 450 V. 300 RPM Elliott 2200 K.W., Gen. Elec. 3 unit 450 V. DC Gen. with 3000 H.P. 720 RPM, 2300 V. AC Motor and Etc.
1	2250 HP	DC MOTOR 600 V. 400/500 RPM, G.E. M.G. Set—2000 K.W. G.E. AC Motor—2300 V.
1	1500 HP	DC MOTOR 600 V. 600 RPM Whse. M.G. Set. 1500 K.W. G.E. 13200 V.
1	1500 HP	DC MOTOR 600 V. 300/700 RPM Whse. M.G. Set—1500 K.W. G.E. 13,200 V.

For listing of Motors, Generators, Transformers, M.G. Sets, Rectifiers, Mill Motors, etc.

See last week issue.

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SHEET METAL MACHINERY

13' 3/16" Shear, 20" gap, extra blades, 10' squaring arm $5,000.00
10' 3/16" Shear, 16" gap.
10' 14 ga. Pexto Shear, Model S2120.
4' 18 ga. Chicago Press Brake, Model 131.
Ransome Welding Positioner, cap. 2500 lbs., var. speed, drive, two tables.
60 ton Niagara Punch Press, 22" throat.
43 ton Niagara Punch Press, 20" throat.
8' 12 ga. Sturdybender Press Brake.
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12' 1/4" Chicago Power Leaf Brake.
FA18 Grob Filer, 18" throat.

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Welding—Structural—Ornamental—Job Shop.
10 Years going profitable business.
Large Clientele—Excellent following.

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FOUR COLBY

WHIRLEY CRANES

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Model 200 COLBY
Capacity 90,000 lbs at 35'-0" radius
Whip—12,000 lbs at 113'-0" radius
Height rail to boom pin—55'-0"

Used lightly—War Years Only
WELL MAINTAINED—
EXCELLENT CONDITION

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Seamless and Welded 1/8" to 26" O.D.
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Specialty large sizes.
Cutting — Threading — Flanging — Fittings — Valves.

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- ANY CRANE CAN BE MODERNIZED TO THE MOST EXACTING SPECIFICATIONS
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FOR SALE

1—3 high Plate Mill—112" wide, complete except for drive motor.

1—42" Sheet-Coil Welding Line complete.

1—15 Roll, Backed-up Newbold Roller Leveler, 5½" dia. rolls x 66" face with drive.

1—125 Ton, 4 girder, 230 volt DC, 85'10" span Morgan Ladle O.E.T. Crane.

1—18"—Two High Farrell Double Rolling Mill with drive, pinion stands and reduction unit.

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BRAKES SHEARS

Will Lease or Furnish Long Terms

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2600 E. Tioga St., Philadelphia 34, Pa.

DIESEL LOCOMOTIVES & CRANES

25 Ton Industrial 60' Boom Crane
12 Gen. Elec. 23, 25, 44, 65 & 80 Ton Diesel Elec. Locos.
2—65 Ton Whitcomb, 1—115 Ton GM & 2—100 Ton Gen. Motors.

STANHOPE 60 E. 42nd St., N. Y. 17, N. Y.

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Rebuilt by American Air

100 CFM	100 psi	8 x 7 Ing. or Worth.
138 CFM	100 psi	7 x Ing.—CPT—Worth.
142 CFM	125 psi	Ingersoll Rand Type 40-Jaeger
183 CFM	150 psi	7 x Jay WGB
191 CFM	300 psi	9-4¼ x 9 ES-2
194 CFM	125 psi	7-7-8 x 5 Worth. M40
234 CFM	100 psi	9 x 8 Ing.—Worth. Ohio Pass
258 CFM	500 psi	10-4½ x 10 Ing.
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364 CFM	100 psi	10 x 9 Jay WGB
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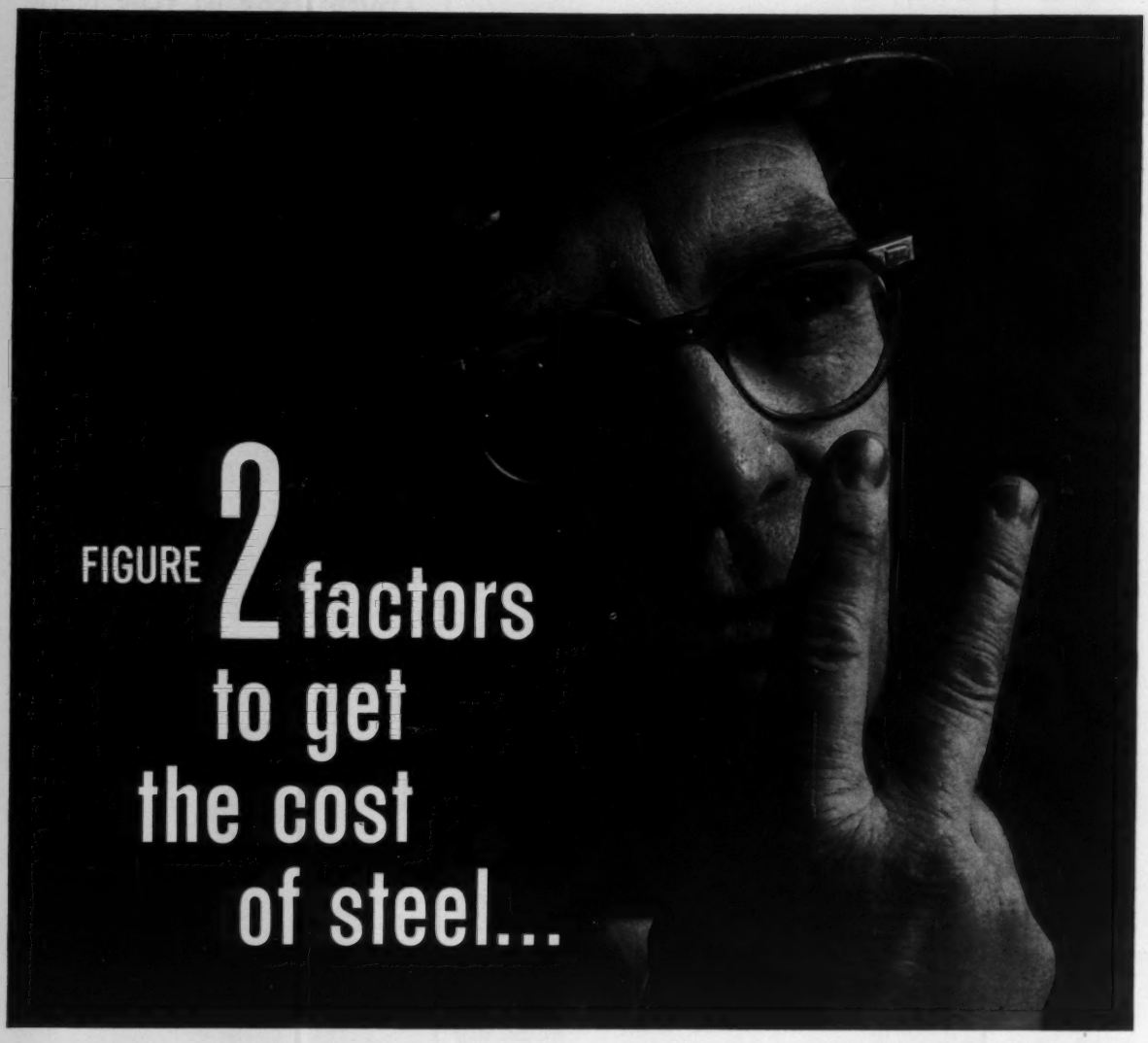

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